NYPL RESEARCH LIBRARIES
3 3433 08182186 4

Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation

http://www.archive.org/details/californianotes00turr

IXG
Turrill

Turrill

IXG

FIRST VOLUME.

CALIFORNIA NOTES.

BY

CHARLES. B. TURRILL.

"O California, prodigal of gold,
Rich in the treasures of a wealth untold,
Not in thy bosom's secret store alone
Is all the wonder of thy greatness shown.
Within thy confines, happily combined,
The wealth of nature and the might of mind,
A wisdom eminent, a virtue sage,
Give loftier spirit to a sordid age."

SAN FRANCISCO:
EDWARD BOSQUI & CO., PRINTERS, COR. CLAY & LEIDESDORFF STS.
1876.

THE NEW YORK
PUBLIC LIBRARY
703122
ASTOR, LENOX AND
TILDEN FOUNDATIONS
R 1915 L

Entered according to Act of Congress, in the year 1876, by CHARLES B. TURRILL, in the office of the Librarian of Congress at Washington.

This Volume is Dedicated to

H. A. ADAMS,

As a Token of Esteem,

By the Author.

PREFACE.

The Series, of which this present volume is the initial number, is designed to take a place hitherto unoccupied in the literature of California.

The author treats of sections made familiar from personal observation, coupling with his notes of travel such information, gleaned from standard sources, as the size of this work would permit. He fully credits all his authorities, and wishes publicly to acknowledge the obligation. He desires also to thank many friends for their kind assistance.

It is hoped that this little book may prove a useful guide to the Tourist, and a storehouse of facts for the Resident. Like the tiny seeds, in whose close bonds the germs of our giant trees lie folded, these fragmentary notes may, perchance, usher in more finished descriptions of the resources and beauties of our Coast.

C. B. T.

San Francisco, July, 1876.

TABLE OF CONTENTS.

CHAPTER I.

INTRODUCTION.

Boundaries and area of California, 1; Topographical features of the State, 2; Coast Ranges, 3; Coast Valleys, 4; Sierra Nevada, 4; West Slope of the Sierra, 5; Great California Valley, 5; Central River System, 5; Mountain Rivers, 6; Vegetation of the Plains, 6; Timber on the Coast Ranges, 6; Sierra Nevada timber-belts, 8; California wild flowers, 10; Climate of Pacific Coast, 11; Rains, 11; Low temperature on the Coast, 12; Various Climates along the Coast, 13; Storms, 13; San Francisco summer winds, 14; Fog, 15; California winter, 17; Annual rainfall at San Francisco, 1849-50—1876, 18; Mean temperature at San Francisco, 19; Means of temperature throughout the State, 20.

CHAPTER II.

SAN FRANCISCO—PAST AND PRESENT.

First dwelling in San Francisco, 22; Yerba Buena, original name of the settlement, 22; The water front in 1835, and at the present time, 23; Founding of the Mission Dolores, 23; Second house in Yerba Buena, 25; First official survey of the town, 25; Hudson's Bay Company, 26; San Francisco, substituted for the name, Yerba Buena, 26; City in 1847, 27; Rapid growth, 27; Area of San Francisco, 28; Early explorations of the Coast of California, 29; California ceded to the United States—opposition of native Californians, 30; Exports from San Francisco—last three months of 1847, 32; Imports—same period, 32; Total imports 1874-75, 32; Total exports, 1875, 33; Production of California, 1875, 33; Production of gold and silver in the State, 1848-1876, 34; Wheat yield of California, 1855-1876, 35; Exports of wool from San Francisco, 1859-1876, 35; Total exports from San Francisco, 1848-1876, 36.

CHAPTER III.

DAYS AROUND SAN FRANCISCO.

Cliff House, 38; Routes thither, 38; Saturday afternoon, 39; Golden Gate, 40; Seal Rocks, 40; Sea lion—value, size, 41; Habits, 43: Food, 45; Northern fur seal, 46: Description of same, 47; Value and plentifulness, 48; Cemeteries of San Francisco, 48; Golden Gate Park, 49; Size and improvement thereof, 50; Other Parks. 52; Portsmouth Square, 52; California occupied in the name of the United States, 52; The Plaza, 53; Telegraph Hill, 53; Early great fires in San Francisco, 54; Woodward's Gardens—situation, etc.—museum, conservatories, aquarium, and other attractions, 55; Exotic Gardens and nurseries, 57; Church of Mission Dolores, 58; Dry Docks, 58; United States Branch Mint, 59; Hotels—Palace, Grand, Lick, Occidental, etc., 59; Places of amusement, 63; Chinese Theatres—location, actors, performances, 63; Chinese Joss Houses, 65; Chinatown, 65; Churches, Educational Institutions and Libraries of San Francisco, 66.

CHAPTER IV.

INTO THE HEART OF THE FOOT-HILLS.

Departure from the city, 67; Views from the ferry boat, 68; Railway journey from Oakland to Stockton, 70; Railroad journey—Stockton to Milton, 72; Gopher Hills, 73; Copper mining region, 74; Copperopolis, 74; Salt Spring Valley, 75; Nut pine, 76; Fruit of the Foothills, 78; The Pliocene Skull—the relic of a former race, 80; Vallecito, 82.

CHAPTER V.

CALAVERAS COUNTY.

Boundaries, area, and rivers of the county, 84; Topography, 85; Limestone belt, 85; Murphy's to Mammoth Trees of Calaveras, 87; Description of trees and shrubs—sugar pine, yellow pine, manzanita, buck-eye, 88; Ditches, 91; Flumes, 91; Iron pipes, 92; Moonlight ride through a California forest, 93.

CHAPTER VI.

CALAVERAS MAMMOTH TREES.

Location of the Grove, 95; First impressions, 95; Young trees, 96; Soil, 96; Dog-wood, 97; Walk through the Grove, 97-103; Age of the

Mammoth Tree, 103; Size of trees, 103; "Sequoia gigantea"—description of the tree, bark, wood, cones, leaves, 103; Places of interest in the neighborhood, 105; Later impressions, 105.

CHAPTER VII.

SOUTH GROVE.

Location and manner of reaching the Grove, 107; Shakes and shake-making, 108; Sylvan scenery, 109; North Fork of the Stanislaus, 110; Basaltic cliffs, 111; Beaver Creek, 111; Chaparral, 112; Ride through the South Grove—trees of interest, 112-116; Characteristics of this Grove, 117; Scenery among the trees, 118.

CHAPTER VIII.

MAMMOTH CAVE OF CALAVERAS.

Location of Cave City, 119; Horseback ride from Mammoth Tree Grove to the Cave, 119; Foot-hill scenery, 120; Sheep in the Sierras, 121; Town of El Dorado, 122; Cave City, 123; Exploration of the Cave—its principal passages and chambers, 124.

CHAPTER IX.

GOLD MINES.

Extent of California gold field, 129; Gold districts, 130; Geology of gold section, 130; Fineness of California gold, 131; Division of the auriferous belt, 132; Southern Mines—location, 132; Mother lode, 134; Other quartz veins, 136; Dead rivers, 137; Sierra Nevada during the Ice age, 137; Volcanic period, 138; Lava-flow in Northern California, 139; Extinct rivers—their courses and characteristics, 140; Theories of origin, 140-43; Formation of gold nuggets, 144.

CHAPTER X.

GOLD MINING.

Different classes of gold mines—their location and manner of working them, 149; Manner of deposit of gold dust, 150; Formation of river bars, 151; Modes of working various kinds of mines, 152; The pan, 154; Cradle, 155; Pudding-box, 156; Board sluice, 156; Hydraulic mining—its origin and growth, 157; The nozzle, 58; Ditch Com-

panies, 158; Ditch Companies own and work diggings, 159; Deposition of tailings, 160; Agriculturists' protest, 160; Miners' plea, 161; Instruments employed in hydraulic mining—sluice box, under current, grizzly, sluice pavement, 162; Manner of working a hydraulic claim, 165; Employment of quicksilver, 166; "Cleaning up," 166; Separation of mercury from the gold, 166.

CHAPTER XI.

TO THE YOSEMITE.

Resume of trip from San Francisco to Milton, 168; Attractions of different routes to Yosemite, 168; Big Oak Flat route, 169; Natural bridges on Coyote Creek, 170; Description of their leading features, 171; Table Mountain—its geographical position and formation, 173; Extent and character of the lava, 174; The bed of a former river, 174; Fossil remains, 175; The ferry boat, 177; Gold Springs, 178; The bed-rock, 179; Columbia, 179; Decrease of population in mining counties, 180; Increased population in agricultural sections, 181; Sonora, 181; Heat of the Foot-hills, 182; Tuolumne County—boundaries, area, resources, 182; Gold detrimental to the best interests of the region, 183; Chinese Camp, 184; Jacksonville, 185; Flood of 1862 on the Tuolumne, 185; Mountain farm, 186; Moccasin Creek, 186; Arroyo, 186; Foot-hill vineyard, 187; Rattlesnake Hill, 187; Soaproot, 187; Priest's, 188; Arastra, 188; Big Oak Flat, 189; First Garrote, 190; Mountain quails of California—description, habits and habitat, 190; Origin of name, Garrote, 191; Topographical nomenclature—changed names, 191; Classes of local names, 191; Indian names, 191; Spanish names, 192; Miners' names, 192; Modern names, 192; Character of the country between Garrote and Yosemite, 193; Sprague's Ranch—type of mountain farm, 193; Heavy timber-belt of the Sierra Nevada, 194; Other routes to the Yosemite, 195; Coulterville route—points of interest passed, 195; Mariposa route, 196; Mariposa Grove of Mammoth Trees, and scenery along the road, 196; Mariposa County—situation, boundaries, extent, resources, 197.

CHAPTER XII.

THE YOSEMITE VALLEY.

Map of the Yosemite Valley, 198; Difficulty of describing the scenery, 199; Size of the Valley, 200; Gateway to the Yosemite, 200; Bridal Veil Fall, 200; Transitory Falls, 202; Branches of the Yosemite Valley, 202; Three Graces, 203; Cathedral Spires, 204; El Capitan, 205;

Three Brothers, 206; Sentinel, 207; Debris, 207; Trees on the debris, 208; Sentinel Fall, 209; Virgin's Tears Fall, 209; Agassiz Column, 209; Meadows, 209; Merced River, 210; Yosemite Fall, 211; Indian Canon, 213; Yosemite Creek, 213; North Dome, 214; Royal Arches, 215; South Dome, 215; Legend of Totokonula and Tesaiyac, 216; Mirror Lake, 217; Glacier Point, 219; Illilouette Fall and Creek, 219; Route to Vernal and Nevada Falls, 220; Merced River, 220; Vernal Fall, 221; Nevada Fall, 222; Snow's, 223; Cap of Liberty, 223; The Indians and how they make bread, 223; Inspiration Point, 225; Union Point, 225; Glacier Point, 226; Sentinel Dome, 226; Divisions of the Yosemite Valley, 226; Level portion, 226; Debris, 226; Cliffs, 227; Theories for the formation of the Valley, 227; Climbing at Yosemite, 228; Length of visit, 228.

APPENDIX.

Routes, Distances, etc., to the Yosemite Valley, 229; map of routes, 232.

CALIFORNIA NOTES.

CHAPTER I.

INTRODUCTION.

THE State of California is, in shape, an irregular parallelogram extending from the boundary line between the United States and Mexico on the south to the parallel of 42° north latitude; and from Nevada and Arizona on the east to the Pacific Ocean. A straight line drawn from the north-west corner to the south-east corner of the State would be a little over eight hundred miles long. The average width of the State is about two hundred miles. The coast line is a broad irregular curve, about 1,100 miles long. The eastern boundary follows longitude 120° W. between the parallels 42° and 39° north latitude; at the latter parallel it turns east (at an angle of about 50° with the line of long. 120° W.) and advances straight to a point on the Colorado River a short distance below Fort Mohave. From that place the Colorado River divides California from Arizona. The area of the State is variously estimated at 155,000 and 188,981 square miles. The latter number is that given at the General Land Office at Washington.

Professor Whitney writes:* "In order to bring vividly before the mind the grand simplicity of the topographical features of California, we may draw on the map of the State five equidistant, parallel lines, having a direction of N. 31° W., and 55 miles apart. Let the middle one of these be drawn at the western base of the Sierra Nevada, touching the edge of the foot-hills, as it will be found to do with the given direction, from Visalia to Red Bluff, the first parallel line east of this, drawn at 55 miles distance, will pass through or very near the highest points of the Sierra, beginning with Mount Shasta, on the north, and touching in succession towards the south, first Lassen's Butte, then Spanish Peak, Pilot Peak, the Downieville Buttes, Pyramid Peak, Castle Peak, Mount Dana, and beyond this, keeping close along the main crest of the Sierra, across the culminating points of the chain which lie to the south of Mount Dana." * * * * *

"The next parallel line east of this, still at the same distance of 55 miles, crosses a series of depressions, mostly occupied by lakes, which we may consider as representing the eastern base of the Sierra. These lakes are the Klamath, Wright, Pyramid, Walker, Death Valley, and Soda Lake, the sink of the Mohave. At its southern extremity, it marks the confluence of the Colorado and Gila Rivers.

"The first line to the west of the central one, or that drawn at the western base of the Sierra, will be found to follow very closely the eastern edge of the Coast Ranges, from the neighborhood of Kern Lake

*Geological Survey of California. Geology, Vol. I.

to that of Clear Lake, a distance of over 300 miles. The second line west of the central one, and the last of the series of parallel, equidistant ones, represents, as nearly as possible, the coast line of the Pacific; or, in other words, the western base of the Coast Ranges. By this curious arrangement, which must be due to the working of great cosmical forces, and which is evidently not the result of chance, we have the State, at least that portion of it between Fort Téjon and Red Bluff, divided into four belts of nearly equal width (a portion of the most easterly one, however, falling within the limits of the State of Nevada), which are designated as follows, naming them in order from east to west: the Eastern Slope, the Sierra, the Great California Valley, and the Coast Ranges.

"This arrangement of the physical features of the State holds good for a length of 400 miles, in the direction of the main axial line, and this division of California is the largest and by far the most important, comprising almost the whole of the agricultural and the greater part of the mining districts, and may be designated as Central California; that portion to the south of a line drawn at right angles to the main axial line, or N. 59° E.—S. 59° W., through Fort Téjon, may be called the Southern Division; that north of a parallel line passing through Fort Reading, may be also designated as the Northern Division of the State."

The designation, Coast Ranges, includes the many mountain ridges, mostly parallel, which, with an average breadth of forty miles, extend along the coast from the northern to the southern boundary

of California. These separate ranges are known by a multitude of names. There does not appear in these ranges, as in the Sierra Nevada, to be any bond of connection between the highest peaks. The entire range is a series of mountain knots and spurs, which stretch in every direction, yet with a general trend, some uniting with neighboring spurs, while others sink into fertile plains. The entire system of mountains is dotted with small valleys of great beauty.

These valleys are largest in the vicinity of the Bay of San Francisco and its tributaries. Here there is a break in the mountain chains. As the spurs from the north trend toward the bays of Suisun, San Pablo, and San Francisco, they spread out like the fingers of a rocky hand. Between these giant digits lie some of the most picturesque valleys in the State. Among these may be mentioned Petaluma, Sonoma, Napa, Suisun and Vaca; while further north, where the fingers unite with the palm, Clear Lake, surrounded by little valleys, reposes in the embrace of the mountains. South of the Bay of San Francisco, the two main ridges of the Coast mountains stand back from the bay, forming the fertile Santa Clara Valley. In Contra Costa County the Mount Diablo group is flanked on all sides by numerous productive valleys.

The ridges of the Sierra Nevada, seventy miles in breadth, extend along the eastern side of the State, from latitude 35° to 40°. At these points they become so merged in the complicated groups of the Coast Ranges that nothing but an extensive examination into the geology of the ridges will reveal which peaks belong to the eastern and which to the western range.

A long axial line extends through the Sierra Nevada. Mount Shasta is the northern terminus of this line, while the southern extremity passes through that knot of high mountains (altitude 10,000 feet and over) which has been designated as the Californian Alps.

The western slope of the Sierra is gradual, sinking into retreating foothills which finally glide into the level plains of the Great California Valley. The eastern descent is more abrupt. As we look at the Sierra from the east it seems like a long, high, rocky coast, against which strange seas have beaten for ages, and on retiring have disclosed the rocky ripples which diversify the surface of the ground in the State of Nevada.

Between the two grand mountain systems of California lies the Great California Valley, about three hundred and fifty miles long and from forty to fifty miles broad. The northern half of this plain is the Sacramento Valley, while the Valley of the San Joaquin forms the southern portion.

Through this central plain, about equidistant from the mountain walls, flow the two great rivers of California. The Sacramento from the north brings down the water from the northern and western portion of the Sierra and the east slope of the Coast Ranges. The San Joaquin from the south drains Kern, Buena Vista and Tulare Lakes, and receives as tributaries all the streams from the western watershed of the lower end of the Sierra Nevada. At the center of the valley the twin rivers empty their united waters into Suisun Bay, whence they reach the ocean through the narrow

Straits of Carquinez, by way of the bays, San Pablo and San Francisco.

On the eastern slope of the Sierra Nevada there are comparatively few rivers, all of which lose themselves in the dry lands of Nevada.

The rivers of the west side of the Coast Range are mostly short and are not navigable, with the exception of the Salinas. The rivers north of the Bay of San Francisco are frequently impeded by sand bars thrown across their mouths by the ocean tides.

Regarding the vegetation of the plains of California, Professor Whitney writes:* "These are the most park-like valleys in the world. By far the largest number of trees in these valleys are oaks, and they grow, not uniformly distributed over the surface, but in graceful clumps, just as if arranged by the most skillful landscape gardener. The burr oak (*Quercus lobata*) is the one which gives, in the central California Valley, the most character to the landscape; it grows to a great size, and has the peculiar, gracefully drooping branches of the American elm; some of the noblest specimens of it are to be found in the Napa Valley. Other conspicuous oaks are the live oak (*Q. agrifolia*), a puzzle to botanists from the variability of its foliage, the white (*Q. Garryana*), the black (*Q. Sonomensis*), and the chestnut (*Q. densiflora*).

"As we rise above the valleys, and especially in the vicinity of the ocean, and in the deep shaded cañons which intersect the mountains, and where the moist-

*The Yosemite Guide Book, pocket edition of 1874, p. 45. The author would refer to this valuable work all who desire a fuller account of the Yosemite Valley than our limited space will allow.

ure brought by the winds from the sea is not too rapidly evaporated, we find a more considerable growth of forest trees in the Coast Ranges, and especially as we proceed toward the northwest. Pines and oaks, however, everywhere greatly predominate. Of the pines, *Pinus Coulteri* is remarkable as having the largest and most beautiful cones of all the pines; *P. Sabiniana*, the digger pine, or silver pine, a very characteristic tree of the foot-hills, especially of the Sierra Nevada, up to 2,000 feet elevation, and also on the dry southerly hillsides of the Coast Ranges; *P. insignis*, the well-known ornamental 'Monterey pine,' quite limited in its distribution to some thousands of acres about Monterey and Carmelo; *P. muricata* is another Coast Range species, and *P. ponderosa* (the yellow pine) and *P. Lambertiana* (the sugar pine) are found in both Sierra and Coast Ranges. The redwood (*Sequoia sempervirens*) is also one of the grand characteristic trees of the California Coast Ranges, to which it is exclusively confined; with it grows frequently the well-known Douglas fir (*Abies Douglasii*). Besides these there are the laurel (*Tetranthera Californica*), of which the wood is now coming into use for ornamental cabinet work; the madrona,* a very characteristic and beautiful tree with its red bark and glossy leaves. The Monterey cypress (*Cupressus macrocarpa*) is another magnificent tree, greatly resembling the cedar of Lebanon; but strictly confined to one locality at Cypress Point, near Monterey. Of the shrubby undergrowth, the chamiso (*Adenostema fasi-*

*"Properly the 'madroño,' but the name is everywhere pronounced and spelled as written above."

culata), the manzanita (*Arctostaphylos glauca*), and different species of the *Ceanothus*, called 'California lilac' by settlers from the Eastern States, on account of the resemblance of its perfume to that of the Eastern lilac, are the most prominent. These shrubs, separate or mingled together, and associated with a variety of shrubby oaks, each furnished with as many thorns as there are points to leaves or branches, make what is universally known in California as 'chaparral'; and large regions, especially near the summits of the mountains in the Coast Ranges, are often densely covered with this abominable undergrowth, utterly preventing free circulation, and rendering parts of the State quite inaccessible." * * * *

"There are four pretty well marked belts of forest vegetation on the west slope of the Sierra, and that of the eastern slope would make a fifth for the whole range. These belts, however, pass gradually into each other, and are not so defined that lines can be drawn separating or distinctly limiting them, and the division into groups or belts here proposed will only be found to hold good in the central portion of the State; as we go north all the groups of species gradually descend in elevation, especially in approaching the coast.

"Of the four belts on the western slope of the Sierra, the lowest is that of the foot-hills, extending up to about 3,000 feet in elevation; its most characteristic species are the digger pine (*P. Sabiniana*) and the black oak (*Q. Sonomensis*) these stand sparsely scattered over the hillsides, or in graceful groups, nowhere forming what can be called a forest. * *

The small side valleys, gulches or cañons, as they are called in California, according to their dimensions, are lined with flowering shrubs, of which the California 'buck-eye' (*Æsculus Californica*) is, at this altitude, by far the most conspicuous, gradually giving place, as we ascend, to the various species of the delightfully fragrant *Ceanothus*, or California lilac. Manzanita and chamiso are, of course, abundant everywhere, and especially on the driest hillsides and summits.

"The next belt is that of the pitch pine, or *Pinus ponderosa*, the sugar pine (*P. Lambertiana*), the white or bastard cedar (*Libocedrus decurrens*), and the Douglas spruce (*Abies Douglasii*); this is peculiarly the forest belt of the Sierra Nevada, or that in which they have their finest development. The pitch pine replaces the digger pine first, and more and more of the sugar pine is seen from about 4,000 feet on to 5,000, at which altitude the last-named noble and peculiarly Californian tree is most abundant. * * It is also in this belt that the 'Big Trees' belong.

"The third zone of forest vegetation is that of the firs (*Picea grandis* and *amabilis*), with the tamarack pine (*P. contorta*) taking to a considerable extent the place of the pitch and sugar pines. This belt extends from 7,000 to 9,000 feet above the sea, in the central part of the State. * * * These firs, especially the *amabilis*, which is distinguished by the geometrical regularity with which its branches are divided, are most superb trees; they attain a large size, are very symmetrical in their growth, and have a dark green brilliant foliage, which is very fragrant. A pine

called *Pinus Jeffreyi*, by some considered a variety of the *ponderosa*, is also a characteristic tree of the upper part of this belt; and above this sets in the *Pinus monticola*, which takes the place of the *Piceas* at a high elevation.

"The highest belt of all is that of the *Pinus albicaulis* (or *flexilis* of some botanists), which marks the limit of vegetation in the middle and northern Sierra, *Pinus aristata* taking its place in the more southern region, about the head of King's and Kern Rivers. The *albicaulis* generally shows itself at the line just where vegetation is going to give out altogether."

Regarding the less imposing vegetation of the valleys and hillsides, Thomas Starr King wrote:

"Early in May * * the country is at the height of its brief bloom. California has often been compared with Palestine and Syria for scenery. The passages in the Psalms and the New Testament which describe the fleeting beauty of the flowers and the grass, are certainly applicable here. 'For the sun is no sooner risen with a burning heat, than it withereth the grass, and the flower thereof falleth, and the grace of the fashion of it perisheth.' Indeed, there is no grass, properly speaking, native to the landscape. The green of early May on the uncultivated plains and slopes is mostly that of the wild oats. As the summer sun rises, and the rains cease, they ripen into a golden tinge, which, at a distance, is the hue of sand, and their seed drops into the parched and crackling ground for new crops when the rain returns. By the middle of June all the wild fields that are destitute of trees look sandy with this harvest of indigenous and self-sowed grains."

The wild flowers of California are not only very abundant but of great variety. The botanist is delighted as he gathers one new treasure after another, until after a few hour's walk he has found material for a long study. In April and May the hillsides around San Francisco are clothed with a myriad-hued robe of flowers. In June the Yosemite Valley, and the Sierra Nevada generally, are carpeted with those "autographs of angels," as a poet has prettily styled them.

In relation to the climate of California, a few extracts from the writings of Lorin Blodget will be of interest.* "The Pacific coast of this continent differs from the west coast of Europe in some conspicuous points, though the two are generally similar, in accordance with the analogies of continental position. * * * * The winter and cooler months are delightfully equable on the whole coast, but the summer is harsh, and widely different from the summers of Europe which have the same temperature for the winter. This reduction of temperature is due to the joint action of the heated surface of the interior and the cold mass of waters off the coast, the last being peculiar to the western coasts of this continent, and unknown to the corresponding coasts of the old world." * * * * * * *

"The rains of the Pacific coast are periodic, * * and in this respect they differ entirely from those of the west of Europe in corresponding latitudes. It is not easy to account for this difference, and particularly for the fact that this periodicity is continued to

*Climatology of the United States. Lorin Blodget. Phila. 1857.

the 48th parallel. At Sitka, lat. 57°, it almost disappears, however, and the year is nearly equally rainy throughout." * * * * * * *

"The rains of this best known portion of the Pacific coast, are * * * peculiar in regard to the attending winds, which from San Diego to Puget's Sound, are, in nearly all cases, from the south-east and south with a strong and steady force. There are, also, simply *attendant* winds, and not those which may be said to bring the rains,—the course of clouds above the local or surface wind being quite regular from the west. But no sooner is precipitation begun than the attendant southeast wind sets in, to be continued steadily to the end of the rain in most cases." * *

"Apparently an immense cold current approaches the coast here at 35 to 45 degrees of latitude, which in summer exercises a wide and decisive influence on all the included coast, its maximum and central point being nearly at San Francisco. The temperature is not only kept at the average of the earlier months of the summer, but it is made to fall below that temperature at exposed points. This anomaly appears most distinctly at San Francisco, where October is equal to July, and September the warmest month of the year. The range between the months of January and July is 8.3° only, while at Washington it is 44.2°, or more than five times as great.

"The coast atmosphere, though of low temperature, does not appear to be as humid as that of England and France, notwithstanding the large quantity of sensible moisture, fog or mist, on the sea winds at San Francisco. Below or south of the Columbia River it

is mainly dry and bracing at all seasons, or the general climatological effect is such, in contrast to that of Sitka where the saturation is excessive, and the quantity of rain like that at Bergen, in Norway. The low temperature southward is a single and distinct condition, as it appears; and if it were removed the whole coast would much more nearly correspond with that of Europe, where, as along the west of Spain and of Portugal, the prevailing features for the season are dryness and serenity.

"Thus the Pacific coast climates are Norwegian, English, and Spanish or Portuguese; with the intermediate France blotted out, and an anomalous temperature substituted, so cold at midsummer as to cut off the vines and corn which ought to be found there. All these are confined to narrow districts or lines also, throughout the entire extent of coast, and they never penetrate the interior or influence very large islands, except that of Vancouver, and no peninsulas." * * * * * * *

"Dr. Gibbons has recently defined some points quite carefully in the course of observations at San Francisco. (Am. Jour. of Science.) He says in regard to storms: 'The easterly storms which form so prominent a feature of the Atlantic climate are unknown here; there is nothing that bears any resemblance to them. The rains from the southeast are often attended with high gales, which extend over a large portion of the western coast of North America and inflict some injury on shipping, but these gales are less violent than the severe easterly storms of the Atlantic coast. The direction of the

cloud producing the rain is often of greater importance than that of the lower atmospheric current. There are usually two strata of clouds, the lower concurring with the wind on the earth's surface and seldom supplying rain, and the higher, which is the true rain-cloud, varying in its course from the lower, and sometimes having the very opposite direction.'"

* * * * * * *

"'In almost every month of the year, even during the dry season, the clouds put on the appearance of rain and then vanish. It is evident that the phenomena which produce rains in other climates are present in this, but not in sufficient degree to accomplish the result except during the rainy season, and then only by paroxysms with intervening periods of drought.'" * * * * * * * *

"The proportion of cloudy days at San Francisco is stated by the same authority (Dr. Gibbons) as very low. * * * Farther in the interior it is well known that the clouds still more completely disappear, giving, for the valleys of the San Joaquin and Sacramento, a sky remarkably free from clouds. * *

"The most remarkable phenomenon there, (in California) is the summer coast wind and its attendant mists. This seems to be due solely to the proximity of districts of great heat and sudden rarefaction on the land, to the cold mass of waters off this coast, and to its refrigerated surface atmosphere. A maximum dry temperature of 110° is often experienced at Fort Miller, a point in the San Joaquin Valley, when at the same time off Monterey and San Francisco the sea and sea wind are at 55°. Such extreme contrasts

existing at sea level and not far apart must be expected to originate violent winds, and it is only wonderful that they are not more severe at the passes giving access to the interior." * * * * *

"Dr. Gibbons describes these winds as follows:

"'Whatever may be the direction of the wind in the forenoon, in the spring, summer, and autumn months, it almost invariably works round to the west in the afternoon. So constant is this phenomenon that in the seven months from April to October inclusive there were but three days on which it failed to do so, and these were rainy. The sea winds are moderate until May, when they begin to give trouble. In June they increase in force, reaching their greatest violence at the beginning of July. In August they decline in force but not in constancy; in September they continue steady though moderate; and in October they lose their annoying qualities and become gentle and agreeable.'" * * * "The winds of five months of the summer are * almost wholly from the sea.

"The attendant mist is peculiar, and it is evidently a condensation produced by contact of the cold air alone, and not by natural condensation in the volume coming from the sea. The air out at sea is usually clear and the mist only forms a narrow rolling line along the place of contact of the volumes differing so widely in temperature. Any cold jet of air intruded into a mass having a high temperature will produce a similar condensation. To quote again from the graphic accounts of Dr. Gibbons:

"'The sun shines forth with genial warmth, the mercury rising generally from 50° at sunrise to 60° or

65° at noon, but when the sun has reached the zenith the wind rapidly increases, coming down in gusts from the hills which separate the city from the ocean, and often bringing with it clouds of mist. But the dampness is never sufficient to prevent the elevation of clouds of sand and dust which sport through the streets in the most lively manner. The mercury falls suddenly, and long before sunset fixes itself within a few degrees of 50°, where it remains pertinaciously till next morning; often not moving a hair's breadth for twelve hours. * * * The mist often increases towards evening and when the wind falls remains all night in shape of a heavy fog. Sometimes, when the sun has been shining brightly the mist comes in from the ocean in one great wave and suddenly submerges the landscape. In short there is no conceivable admixture of wind, dust, cloud, fog, and sunshine that is not constantly on hand during the summer at San Francisco.'

"Sometimes this mist falls in a palpable fine rain, and it generally gravitates towards the earth as fast as formed. It is evidently the condensed moisture of the heated air of the interior, which though intensely dry when at its very high temperature, must necessarily condense moisture in cooling 30° or 40°, and to little more than half its measure of heat on the surface and in the full exposure to the sun."

* * * "It is in summer only that these effects are felt, and that the local peculiarity exists in the temperature of the sea. In winter the water is actually warmer than in July, apparently because the force driving the cold current from the northern seas

has become greatly weakened, and the current being less, it is perhaps overlaid by the warm waters of the average of that sea in those latitudes. In winter, therefore, the disturbance or anomaly ceases which forms so singular a feature of the climate of the warmer months for near twenty degrees of latitude."

* * * * * * * * *

"The elastic atmosphere and bracing effect of the Pacific climates constitutes a striking difference from those of the Eastern States. Whether due to the absence of humidity alone is not clear, but to whatever cause it is due, it is a notable practical feature. The interior valleys where the heat is excessive are similar to the cold coast also, and there is no climate which is not the reverse of enervating. * * The heat of the south, where the peculiarities of Spain are reproduced, is never enervating, and that of the excessively hot valleys of the interior is singularly endurable."

Regarding the rains of the State, Dr. Gibbons writes:

"It is a striking feature of the winter of California that when the weather puts on its rainy habit, the rain continues every day for an indefinite period; and when it ceases there is an entire absence of mist for a long time."

The amount of rain which annually falls in California is extremely irregular. The following table of the yearly rain fall at San Francisco, from the observations of Mr. Thomas Tennent, will be of interest to some readers:

YEAR	INCHES
1849–50	33.10
1850–51	7.40
1851–52	18.44
1852–53	35.26
1853–54	23.87
1854–55	23.68
1855–56	21.66
1856–57	19.81
1857–58	21.88
1858–59	22.22
1859–60	22.27
1860–61	19.72
1861–62	49.27
1862–63	13.62
1863–64	10.08
1864–65	24.73
1865–66	22.93
1866–67	34.92
1867–68	38.84
1868–69	21.35
1869–70	19.31
1870–71	14.10
1871–72	34.71
1872–73	18.02
1873–74	23.98
1874–75	18.40
July 1, 1875, to April 30, 1876	25.81

N. B.—Observations from July 1st to July 1st.

MEAN TEMPERATURE AT SAN FRANCISCO.

From data furnished by Thomas Tennent, San Francisco (three observations daily).

MONTHS.	1873.			1874.			1875.		
	SUNRISE	12 M.	6 P.M.	SUNRISE	12 M.	6 P.M.	SUNRISE	12 M.	6 P.M.
	○	○	○	○	○	○	○	○	○
January...	40	60	56	41	50	46	40	50	47
February..	35	55	53	41	53	49	44	57	52
March	39	59	55	42	55	50	43	58	54
April.....	39	59	56	45	61	55	49	63	57
May	40	61	57	49	64	59	49	66	61
June.....	42	64	59	50	67	62	51	68	63
July	44	64	60	52	65	59	52	65	61
August....	46	63	60	53	66	60	51	65	59
September	46	64	60	55	68	60	51	65	58
October...	49	63	56	52	64	57	53	68	61
November.	48	59	54	47	57	52	51	60	56
December.	43	51	48	38	48	44	44	53	50

The following table of mean temperatures will convey an idea of the climate of California. The authority is Lorin Blodget's Climatology of the United States:

TABLE OF MEAN TEMPERATURES. (CALIFORNIA.)

STATIONS.	Jan.	Feb.	Mar.	Apl.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
Fort Jones	31.4	37.4	43.1	49.3	54.7	61.5	71.5	68.7	62.7	51.8	41.8	32.5
Fort Humboldt	43.1	46.8	50.0	54.1	55.3	58.6	56.7	57.0	57.0	53.0	48.6	45.7
Fort Ross	47.2	48.0	49.9	51.3	55.3	56.9	57.9	58.4	56.0	53.4	50.9	48.9
Fort Reading	44.2	49.3	54.4	59.4	65.8	77.9	82.9	79.1	71.8	62.3	52.9	44.8
Sacramento	45.3	48.4	51.3	59.2	67.0	71.7	73.9	73.0	66.9	61.9	52.0	45.1
Benicia	47.0	52.1	53.1	57.4	59.2	67.1	67.3	66.6	64.6	62.8	54.3	47.9
San Francisco	49.6	51.8	52.9	55.3	55.3	56.8	57.9	57.2	58.3	57.9	54.3	51.2
Los Angeles	52.8	55.1	58.3	—	—	73.1	75.0	75.0	75.0	69.0	59.0	60.8
Fort Miller	47.0	53.0	56.7	62.9	68.8	83.2	90.2	83.0	76.1	67.5	55.5	48.0
Monterey	52.2	50.5	51.5	53.7	56.8	57.8	58.5	59.6	59.3	58.4	54.2	50.9
San Diego	51.9	53.3	56.0	61.2	62.7	67.4	72.7	73.7	70.9	65.5	56.9	51.7
Fort Yuma	56.4	58.0	66.1	73.5	76.7	87.3	92.3	90.3	86.1	76.5	54.4	55.9

Table of Mean Temperatures. (California.)—Continued.

STATIONS.	Spring	Sum.	Aut.	Win.	Year	Years and Months.	Position Sta'n. Lat.	Long	Alt	Date.
	°	°	°	°	°		° ′	° ′	Ft.	
Fort Jones	49.0	67.3	52.1	33.8	51.4	2—6	41 36	122 52	2570	1853 to June, 1855
Fort Humboldt	53.1	57.4	52.9	45.2	52.1	1—6	40 46	124 09	50	1854 to June, 1855
Fort Ross	52.2	57.7	53.1	48.0	52.8	4—0	38 35	123 00	50	1837 to 1840.
Fort Reading	59.9	80.0	62.3	46.1	62.1	3—3	40 28	122 05	400	1852 to 1855.
Sacramento	59.2	72.8	61.3	46.3	59.9	3—0	38 33	121 20	50	1849 to 1852.
Benicia	56.5	67.0	60.6	49.0	58.3	6—0	38 03	122 08	64	1849 to 1855.
San Francisco	54.5	57.3	56.8	50.9	54.9	4—0	37 48	122 26	150	Jul '52 to Jun '55
Los Angeles	—	74.4	67.7	56.2	—	—	34 03	118 12	457	Jun '47 to Mar '48
Fort Miller	62.8	85.5	66.4	49.3	66.0	4—0	37 00	119 40	402	1851 to 1855.
Monterey	54.0	58.6	57.3	51.2	55.3	5—0	36 36	121 52	140	1847 to 1852
San Diego	60.0	71.2	64.4	52.3	62.0	6—0	32 42	117 14	150	1849 to 1855.
Fort Yuma	72.1	90.0	75.7	56.8	73.6	3—6	32 43	114 36	120	Jun '52 to May '55

CHAPTER II.

SAN FRANCISCO—PAST AND PRESENT.

IT IS not unusual to hear exclamations of surprise from the visitor in San Francisco when he sees for the first time this young city of the Pacific. To an inhabitant of the Old World, or even to a resident of the longer-settled districts of our country, it is a source of wonder to contemplate the rapid growth from one dwelling—a large tent*—in 1835, to a city with an estimated population of two hundred and thirty thousand† in 1875.‡

Our space will permit but a brief *résumé* of the development of San Francisco. Its political history possesses but small interest for the tourist, and we will, therefore, refer to but a few of the more important events.

The original name of the little hamlet which afterwards became this city was Yerba Buena. This name was also applied to an island in the Bay of San Francisco—now called Goat Island—and to a small cove in the peninsula, opposite that island, along which a few rude buildings were scattered. This minor bay extended between Clark's Point and Rincon Point, a distance of little more than half a mile. A few rocks

*Annals of San Francisco. N. Y. 1860, p. 163.

†Municipal Reports of San Francisco 1874-75, p. 111.

‡Estimated Population (March 1st, 1876,) Langley's Directory, 272,345.

at Clark's Point afforded the only landing for small boats. The water was shallow within the cove, and at low tide an extensive mud flat was here disclosed. Many who to-day visit the Post Office, at the corner of Washington and Battery streets, little think that this building with all in the vicinity is built upon soil over which the waters of the bay once flowed. The bay originally extended to a point on the present Jackson street, midway between Montgomery and Kearny. To-day the water front is nearly six blocks, more than half a mile, farther toward the east, thus reaching deep water. The greater number of the importing and wholesale houses stand where during the "Fall of '49 and the Spring of '50" large vessels were anchored.

The Mission of San Francisco was founded October 9th, 1776.* The original designation was Mission de los Dolores de Nuestro Padre San Francisco de Assisi, which dwindled first to Mission Dolores, and then to the "Mission." The Mission was named in honor of the sufferings of Francisco of Assisi, the founder of the Order of Franciscans. It was first located "near the 'lagoon,' back of Russian Hill; but the winds were so bitter there that soon it was removed to the spot on the creek where the crumbling old church and some of the houses that surrounded it still stand."†

A land expedition from Monterey arrived at a point near the northern end of the peninsula of San Francisco, June 27th, 1776. "Some soldiers, and a few families from Sonora, as intending settlers, had accompanied the expedition. They carried with them a

*History of California, Franklin Tuthill. S. F. 1866, p. 85.
†History of California, p. 86.

number of black cattle and sheep, horses, mules, field and garden seeds, and other necessary means of stocking and making the settlements a profitable investment. While waiting the arrival of the store-ship from Monterey, which, owing to foul winds, did not take place till the 18th of August following, the expedition began to make preparations for their permanent abode by cutting down timber, and selecting what appeared to be the most eligible site for a settlement. On the 17th day of September, solemn possession was taken of the Presidio, 'the day,' according to Father Palou, the historian of the achievements of Father Junipero,* 'being the festival of the impression of the sores of Saint Francis, the patron of the port. After blessing, adoring, and planting the holy cross, the first mass was chanted, and the ceremony concluded by a *Te Deum*; the act of possession in the name of our sovereign being accompanied with many discharges of artillery and musketry by sea and land.'"†

Besides the Presidio and Mission, a fort was also built. This was constructed on the rocky hight which was afterward leveled off when the brick fort which now commands the entrance to the bay of San Francisco was erected.

---

*Father Junipero Serra was one of the most energetic of the founders of the California Missions. He was, although in wretched health, one of a land expedition to Alta California in 1769. He made the mission on the Carmel River his home, after its founding. He was the founder of eight missions. Father Junipero was "the President of all the missions in Upper California until his death," in 1784.—See History of California, Franklin Tuthill, chap. 6.

†Annals of San Francisco, p. 47.

"Before 1835, the village of Yerba Buena had neither name nor existence."* In that year Captain W. A. Richardson, manager of two schooners doing business between the missions around the bay, was appointed first Harbormaster. He erected a tent, which was the nucleus of the future city. Whale ships began to visit the port for supplies in 1822, and continued so to do until the days of the gold excitement. At that time they refitted at the Sandwich Islands, partly with a view to prevent their crews from deserting *en masse* and rushing to the gold fields.

The second house erected in Yerba Buena—a frame building, sixty feet long and twenty-five feet broad—was completed July 4th, 1836. This stood at a point which was afterward the corner of Clay and Dupont streets. The day that this house was finished was made a holiday, and the American flag was then raised for the first time on the shores of Yerba Buena.†

The first regular survey of the plain and cove of Yerba Buena was made in 1839, by order of Don J. B. Alvarado, Constitutional Governor of California. "It included those portions of the present city which lie between Pacific street on the north, Sacramento street on the south, Dupont street on the west, and Montgomery street on the east."‡ This last street then formed the beach of the cove.

Until 1841 the history of this small village is of little interest. It was separated by a barrier of sand hills from the Mission Dolores, about three miles distant, and was also divided from the Presidio by

*Annals of San Francisco, p. 162.
†Annals of San Francisco, p. 169.
‡Annals of San Francisco, p. 172.

another range of hills. In 1841, the Hudson's Bay Company bought the frame house before mentioned, and continued in possession until 1846, in which year they sold their property and removed from Yerba Buena. In 1844, the place contained about a dozen houses and boasted a population of fifty. In 1846, the number of inhabitants is stated to have increased to two hundred,* and from that time the progress of the settlement was more marked.

On January 30th, 1847, the following important ordinance appeared:

"WHEREAS, the local name of Yerba Buena, as applied to the settlement or town of San Francisco, is unknown beyond the district; and has been applied from the local name of the cove on which the town is built: *Therefore,* to prevent confusion and mistakes in public documents, and that the town may have the advantage of the name given on the public map,

"IT IS HEREBY ORDAINED, that the name of SAN FRANCISCO shall hereafter be used in all official communications and public documents, or records appertaining to the town.

"WASH'N A. BARTLETT, Chief Magistrate.

"Published by order,

"J. G. T. DUNLEAVY, Municipal Clerk."†

At the end of April, 1848, at the time the rush to the newly discovered gold mines began, the population of San Francisco was about one thousand. Those were days of excitement. Ship loads of gold hunters were almost daily arriving, and every day witnessed the departure of miners to the new El Dorado.

---

*Annals of San Francisco, p. 173.

†Annals of San Francisco, pp. 178, 179.

In 1847, the principal parts of the town were laid out in fifty vara lots (137½ feet square). These subdivisions, of which six formed a block, sold for less than sixteen dollars each. The land farther from the water front was sold in one hundred vara pieces (four fifty vara lots) for less than thirty dollars each. Prior to this time, on July 20th, 1847, about two hundred water lots, which have since been filled in as has been before mentioned, were sold "for the benefit of the Town of San Francisco." These lots were about 45x137½ feet, and the prices paid ranged from fifty to one hundred dollars each. Such was the value of real estate in the "town" of San Francisco previous to the days of gold excitement.

In regard to the rapid growth of San Francisco at this time, the following extract from Bayard Taylor's El Dorado (Household Edition, N. Y., 1873, pp. 109–110) is of interest. The writer was returning from a hasty excursion to "the mines," and mentions the changes which had taken place during his absence of three weeks: "The town had not only greatly extended its limits, but seemed actually to have doubled its number of dwellings since I left. High up on the hills, where I had seen only sand and chaparral, stood clusters of houses; streets which had been merely laid out, were hemmed in with buildings and thronged with people; new warehouses had sprung up on the water side, and new piers were creeping out toward the shipping; and the noise, motion and bustle of business and labor on all sides were incessant."

It was many years after its permanent settlement before the property holders formed any idea of the

area over which the city of San Francisco would soon extend. This is what was written in 1853:*

"The deepening water will prevent the city from moving much farther into the bay, while the steep rising grounds in the rear will equally prevent it from climbing and spreading over the sandy, irregular country beyond them. The city will probably, therefore, be forced to proceed northward towards the North Beach, where there is already a long pier formed, but where there is remaining but limited buiiding room at best. It will also spread, as it is beginning to do, over the extensive and comparatively level tract of ground lying to the south-west, on the banks of Mission Creek, and in the direction of the Mission Dolores. Perhaps not many years hence the whole shores at North Beach and South Beach (Mission Bay), and the bay itself to a considerable distance from the present high-water mark, will be covered with streets and houses, quays and long-piercing piers, just as now is the cove of Yerba Buena."

To-day the "City and County of San Francisco" covers an area of 26,861 acres, of which 1,500 acres, constituting the Presidio reservation, belong to the United States Government.† The city has been "forced to proceed northward towards North Beach," and has extended "over the comparatively level tract of ground lying to the southwest." But the "steep rising ground in the rear" has not prevented the extension of the city westward "over the sandy irregular country." The entire County of San Fran-

*Annals of San Francisco, p. 160.

†Natural Wealth of California, p. 644.

cisco is laid out in building lots, the smallest and most remote of which sell for more than the lots at the first sale of real estate in "the Town of San Francisco, Upper California." Many of the hills that formerly stood in the way of improvement have been removed, and where a mountain of sand towered in 1849 the Lick House is located to-day. Immense amounts of money have been expended in leveling hills and filling in the bay, but the work has scarcely more than begun.

A digression may be pardoned here. It is well known that the territory at present embraced in the State of California was discovered in 1542 by Juan Rodriguez Cabrillo, a Portuguese by birth, sailing in the service of Spain. "He discovered and named the Farallone Islands," and also a cape, which he named Mendosa, in honor of his friend the Viceroy of Mexico, under whose auspices he had sailed from Navidad, Mexico.*

The cape which Cabrillo discovered is now called Mendocino.

Sir Francis Drake discovered a bay at lat. 38° (Drake's Bay) in 1578. He was not aware that the Spanish had landed on this coast thirty-six years previous. He accordingly took possession of the land in the name of Elizabeth, and called the country New Albion.

General Sebastian Viscaino, sailing under orders from Philip III.† of Spain, in 1602 explored the coast of Upper California, discovering the harbor of San

*Natural Wealth of California, p. 5.

†Natural and Civil History of California—Translated from Spanish of Miguel Venegas (Madrid, 1758), London, 1759, pp. 172—179.

Diego, November 10th: the bay of Monterey* December 16th of the same year; and subsequently the islands in the Santa Barbara channel. Viscaino also anchored behind a point of land which he named Punta de los Reyes. He there (in Drake's Bay) found the wreck of a Spanish vessel lost in 1595.

Numerous attempts were made from 1610 to 1660 to explore the country, in which it was thought that valuable mineral deposits were to be found. These expeditions all set out from Mexican ports.

In 1767 the Fathers of the Order of St. Francis began their work of founding Missions in Alta California. The missionaries effected the restoration of the country to Spain.

The names, "New Albion," and "Drake's Land back of Canada" were discarded, and the former name, California, again was used to designate a territory of immense extent, but uncertain boundaries. California had so long been used to characterize the peninsula alone, that the territory to the north was denominated New, Upper, or Alta California.

When Mexico became a separate government the large tract of California was a part of her territory. At the conclusion of the Mexican war it became a portion of the United States. During these early days there was a bitter feeling against the Americans in some quarters, and some leading men among the number, the then Territorial Governor—Pio Pico, a native Californian—favored annexation to England. The Governor, in addressing the Departmental As-

*Named in honor of Gasper de Zunniga, Count de Monte Rey, at the time Viceroy of Mexico. The bay was first called Port of Pines.—Natural Wealth of California, p. 6

sembly, in May, 1846, said:* "We find ourselves threatened by hordes of Yankee emigrants, who have already begun to flock into our country, and whose progress we cannot arrest. Already have the wagons of that perfidious people scaled the almost inaccessible summits of the Sierra Nevada, crossed the entire continent, and penetrated the fruitful valley of the Sacramento. What that astonishing people will next undertake, I cannot say; but in whatever enterprise they embark, they will be sure to be successful. Already, these adventurous voyagers, spreading themselves far and wide over a country which seems to suit their tastes, are cultivating farms, establishing vineyards, erecting mills, sawing up lumber, and doing a thousand other things which seem natural to them."

Yes, "hordes of Yankee emigrants" have flocked into California. No longer do the Missions form the centres of civilization. Immense herds of wild cattle have ceased to roam over the valley lands. The adventurous voyagers are indeed "doing a thousand things which seem natural to them," Another race, or more properly a combination of races, now possesses the lands once held by the native Californians. American enterprise has wakened the country from its lethargy, the hills open their treasure vaults to the miners' repeated knockings, and wild oats have been superceded by more fruitful cereals. Commerce has visited the port of St. Francis. Manufactories are transforming the raw products of the State into a variety of useful forms. Yes, the California of

*Natural Wealth of California, p. 51.

Pio Pico's time exists no longer; but a grand commonwealth has risen to take its place.

The total exports from the port of San Francisco for the last three months of 1847 are reported at $49,597.53; imports for the same period at $53,589.73. Of the amount exported $30,353.85 represent the native produce of California.*

"The total importations for the years 1874 and 1875 stands thus:†

	1874.	1875.
Foreign	$26,867,696	$29,424,200
Domestic via Panama	8,713,862	4,797,258
Domestic via Railroad	16,000,000	20,000,000
Domestic via Clipper	25,000,000	27,500,000
Totals	$76,581,558	$81,721,458
		76,581,558
Increase over 1874		$5,139,900

"In this, where no account of Coin and Bullion is taken, the increase by clipper and by railroad is quite as remarkable as the decrease by steam via Panama. Of these imports much larger stocks are carried forward into 1876 than were carried forward a year ago into 1875, but there is no doubt that there will be an increased consumption, and imports in the early part of the year will probably be light."

*Annals of San Francisco, p. 198.

†San Francisco Journal of Commerce, January 12, 1876. Vol. 6, No. 2.

Total exports during 1875:

Total exports of Foreign commodities	$ 3,528,588
Total exports of Domestic commodities	31,288,424
Total exports of Domestic commodities via Panama to Atlantic ports of United States	1,948,625
Total exports during 1875	$36,765,637

The production of the State of California for 1875 is shown in the following table:*

Articles.		Value.
Wheat	13,000,000 lbs	$ 26,000,000
Gold and Silver		26,000,000
Wool	48,183,017 lbs	8,450,000
Wine	10,000,000 gallons	3,000,000
Fruit Crop		2,000,000
Barley, Oats, Hay, etc		5,000,000
Dairy Products		5,000,000
Lumber		5,000,000
Coal		1,250,000
Quicksilver		2,000,000
Copper, etc		250,000
Manufactures (value of labor added)		41,000,000
Total		$124,950,000

The following table shows the estimated production of gold and silver in California since 1848. These figures can be only approximated, as large sums have been removed from the State of which no record can be obtained (S. F. Journal of Commerce):

*San Francisco Journal of Commerce, Jan. 12, 1876.

Year.	Amount.
1848	$ 5,000,000
1849	23,000,000
1850	59,000,000
1851	60,000,000
1852	59,000,000
1853	68,000,000
1854	64,000,000
1855	58,000,000
1856	63,000,000
1857	64,000,000
1858	59,000,000
1859	59,000,000
1860	52,000,000
1861	50,000,000
1862	51,500,000
1863	50,000,000
1864	35,000,000
1865	35,020,000
1866	26,000,000
1867	25,000,000
1868	22,000,000
1869	21,000,000
1870	25,800,000
1871	25,850,000
1872	21,450,000
1873	20,000,000
1874	26,000,060
1875	26,000,000
Total	$1,153,620,060

The following table shows the wheat yield for each successive year since 1855:*

Year.	Centals.
1855–56	3,500,000
1856–57	3,250,000
1857–58	3,000,000
1858–59	3,000,000
1859–60	3,700,000
1860–61	5,500,000
1861–62	4,500,000
1862–63	4,750,000
1863–64	5,000,000
1864–65	4,000,000
1865–66	5,000,000
1866–67	9,000,000
1867–68	9,000,000
1868–69	10,000,000
1869–70	10,500,000
1870–71	9,750,000
1871–72	7,750,000
1872–73	16,000,000
1873–74	14,500,000
1874–75	21,000,000
1875–76	17,000,000
Total	169,700,000
California previous to 1855	500,000
Total	170,200,000

There has been exported from San Francisco in seventeen years, as shown in the following table, 248,668,590 lbs of wool, worth $52,822,018:*

Year.	Pounds.	Value.
1859	2,378,050	$ 356,790
1860	3,055,325	297,193

*San Francisco Journal of Commerce, Jan. 12, 1876.

1861	3,721,998	507,271
1862	5,990,300	1,068,872
1863	4,268,480	1,225,415
1864	5,935,670	1,254,778
1865	6,549,931	1,334,425
1866	4,662,029	897,908
1867	7,057,631	1,143,571
1868	13,225,181	2,404,399
1869	13,263,662	2,370,065
1870	19,399,209	3,718,493
1871	22,485,443	6,748,824
1872	24,578,980	7,750,000
1873	29,235,376	6,430,352
1874	34,678,203	6,863,662
1875	48,183,017	8,450,000
Totals	248,668,590	$52,822,018

The total exports from San Francisco, reported since 1848, have been as follows:*

Year.	Value.
1848–50	$ 60,900,000
1851	45,989,000
1852	45,779,000
1853	54,968,000
1854	52,045,633
1855	45,161,731
1856	59,697,434
1857	48,967,692
1858	47,548,026
1859	47,640,462

*San Francisco Journal of Commerce, January 12, 1876.

1860	42,325,916
1861	40,676,758
1862	42,561,761
1863	46,071,920
1864	55,707,201
1865	44,426,172
1866	44,365,668
1867	40,671,797
1868	36,358,096
1869	37,287,114
1870	32,983,139
1871	17,253,346
1872	29,330,436
1873	24,715,125
1874	30,050,632
1875	36,765,637
Total	$1,110,247,656

This of course does not include mail shipments, shipments East direct from the mines, nor treasure carried away by individuals.

CHAPTER III.

DAYS AROUND SAN FRANCISCO.

ALMOST the first place which the tourist visits after his arrival in San Francisco is the Cliff House. It is situated on a high rocky bluff a short distance south of Point Lobos,* the southern doorpost of the Golden Gate. The distance of this house from the old City Hall, on the corner of Kearny and Washington streets, is called six and a half miles. The Cliff House may be reached by three routes. One of these is the old road that begins at the Mission and winds over the hills, affording many attractive views of the city, and the bay beyond, the Contra Costa Hills, and Mount Diablo towering in the remote east. This road descends to the ocean beach, passing near Merced Lake—Laguna de la Merced—the largest lake in the county. From the Ocean Side House to the Cliff House, a distance of some two and a half miles, the road follows the sandy beach. As this route is quite long, and the latter part of the road is very heavy, but few follow it.

---

*Punta de los Lobos—Wolves' Point. "The south head of the entrance into the Bay of San Francisco is formed by this point, 375 feet high."—Davidson's Report. U. S. Coast Survey.

"The desolate neighborhood of Point Lobos was infested with numberless wolves in bygone days."—The Golden Gate. James Linden. S. F. 1869.

Another route is by Point Lobos Avenue, a broad, well macadamized street, commencing at the western end of Geary street and continuing in a straight line to the ocean beach. This was for many years the fashionable drive for San Franciscans. Since the Golden Gate Park has been opened, and its serpentine drives to the beach completed, the Point Lobos Road has fallen into disuse. By far the pleasantest drive to the Cliffs lies through the Golden Gate Park, from every point of which fine views of the city and adjacent country may be enjoyed. As we drive down the long winding road across the waste of sand west of the city, on a clear day, we can plainly see the Farallones on the western horizon.

The Cliff House may be reached by street cars and omnibuses running along Point Lobos Avenue.

Saturday afternoon is, in San Francisco, a time of almost universal recreation. The banks and more than half of the large wholesale houses close at noon. During the afternoon streets leading to the Golden Gate Park, as well as the park drives, are thronged with unbroken lines of buggies, phaetons, rockaways, coupés, drags, dog-carts, and in fact almost every style of conveyance that the ingenuity of man has contrived. Gay couples on horseback and energetic pedestrians are all moving toward the "Cliff." Numerous four-in-hands appear among the motley throng, where Patrick is also seen with his spouse and children going to the "Cliff" in his express wagon, which happens to be disengaged this afternoon. As we ride along we see one millionaire after another, until the mind is confused with the calcula-

tion of the many millions represented. Young clerks with small salaries are the gayest of the throng, and obtrusively suggest the question, how can a young man with small wages afford to dress expensively, hire showy turn-outs, give costly suppers, and spend much money in other ways? It would be perhaps unjust to hint any graver wrong than the prevailing extravagance of the age. Yet, how fast young men live on small salaries, is one of the marvels of our time.

When we have enjoyed a pleasant morning drive and a breakfast at the "Cliff," we are ready to notice other interests which cluster around this locality.

Immediately north is the Golden Gate, and the sight of the incoming and outgoing vessels is worth the exertion of reaching this point. To the south of the rocky bluff on which the Cliff House stands, the broad, low, sandy beach stretches for miles away. On this beach the occasional fragment of a vessel suggests the story of shipwreck. During a clear day the Farallone Islands, about twenty miles westward, are clearly seen, while at night the lighthouse that is located there sheds its ruddy flames from the western horizon.

The most prominent object of interest is the Seal Rocks. These are a cluster of conical rocks projecting to a height of fifty feet above the surface of the water, at a short distance from the bluff on which the Cliff House stands. These rocks derive their name from their being inhabited by the seals and sea lions which abound along the entire western coast of the American continent. While we sit in the broad

hotel porch and watch through field-glasses the movements of these interesting animals, protected here from destruction by law, we may read with interest the following extracts from that interesting work, "The Marine Mammals of the Northwestern Coast of North America," by Charles M. Scammon:

"Among the numerous species of marine mammalia found upon the Pacific Coast of North America, none excite more interest than the Sea Lion; even the valuable and almost domesticated Fur Seal of the Pribyloff group of islands fails to equal it in utility to the Aleutians, who depend upon it not only as a staple article of food, but obtain, by the sale of its silky skin, their foreign luxuries of every nature" (p. 124).

"The extreme length of the full-grown male Sea Lion of the north may be set down at sixteen feet from tip of nose to end of posterior flippers, and yield of oil at forty gallons; but it is seldom they are found measuring twelve feet from tip of nose to tip of tail, and the individual yield of oil throughout the season would not exceed ten gallons. Its greatest circumference would not be over eight feet, and its weight about one thousand pounds. Its head and neck are more elongated, and the latter is destitute of the mane which is characteristic of the Lion of the southern seas. Its mouth is armed with strong, glistening, white teeth. Its projecting upper lip is furnished, on each side, with strong, flexible whiskers, which are generally of a white, or yellowish-white color, some of which grow to the length of eighteen inches. When the animal is either excited by curiosity or anger, its eyes are full of expression;

and at such times they appear large, but when the creature is dozing, these members have quite the opposite appearance. Its ears are cylindrical at the root, tapering to a point, are covered with short, fine hair, and lie nearly in a line with the body. Its limbs, which are incased with a sort of thick shagreen, combine the triple functions of legs, feet, and fins, and are far better adapted to locomotion in the watery element; where, when excited, its movements are swift and graceful, while on the land, the creature's imposing, though awkward traveling, requires great effort. Its body is covered with short, coarse, shining hair. The color of the adult males is much diversified; individuals of the same rookery being quite black, with scattering hairs tipped with dull white, while others are of a reddish brown, dull gray, or of light gray above, darker below. The adult female is not half the bulk of the male, and its color is a light brown. One of the average size, taken at Santa Barbara Island, coast of California, in the spring of 1871, measured six feet four inches from tip of nose to tip of posterior flippers, and weighed one hundred and eighty-two pounds." * *

"Both males and females have a double coating of fat or blubber, lying between the skin and the flesh of the body. These coatings are separated by a thin layer of muscular tissue. The fat yields the oil of commerce, although inferior in quality to that of the Sea Elephant. The young pups, or whelps, are of a slate or black color, and the yearlings of a chestnut brown." * * * * * * * *

"The habits of the Sea Lion exhibit many striking features. It not only dwells near the Arctic and Antarctic latitudes, but it basks upon the glittering sands under an equatorial sun. On approaching an island, or point, occupied by a numerous herd, one first hears their long, plaintive howlings, as if in distress; but, when near them, the sounds become more varied, and deafening. The old males roar so loudly as to drown the noise of the heaviest surf among the rocks and caverns; and the younger of both sexes, together with the 'clapmatches,'* croak hoarsely, or send forth sounds like the bleating of sheep or the barking of dogs; in fact, their tumultuous utterances are beyond description. A rookery of the matured animals presents a ferocious and defiant appearance; but usually, at the approach of man, they become alarmed, and, if not opposed in their escape, roll, tumble, and sometimes make fearful leaps, from high precipitous rocks, to hasten their flight. Like all others of the seal tribe, they are gregarious, and gather in the largest numbers during the 'pupping season,' which varies in different latitudes. On the California coast it is from May to August, inclusive, and upon the shores of Alaska it is said to be from June to October; during which period the females bring forth their young, nurse them, associate with the valiant males, and both unite in the care of the little ones, keeping a wary guard, and teaching them, by their own parental actions, how to move over the broken, slimy, rock-bound shore, or upon the sandy, pebbly beaches, and to dive and gambol amid the

*Name given females of Northern Fur Seal.

surf and rolling ground-swells. At first the pups manifest great aversion to the water, but soon, instinctively, become active and playful in the element; so, by the time the season is over, the juvenile creatures disappear with the greater portion of the old ones; only a few of the vast herd remaining at the favorite resorts throughout the year. During the pupping season, both males and females, so far as we could ascertain, take but little, if any, food, particularly the males; though the females have been observed to leave their charges and go off, apparently in search of subsistence, but they do not venture far from their young ones. That the Sea Lion can go without food for a long time is unquestionable. One of the Superintendents of Woodward's Gardens informed me, that in numerous instances they had received Sea Lions into the aquarium, which did not eat a morsel of nourishment during a whole month, and appeared to suffer but little inconvenience from their long fast.

"As the time approaches for the annual assemblage, those returning or coming from abroad are seen near the shores, appearing wild and shy. Soon after, however, the females gather upon the benches, cliffs, or rocks, when the battles among the old males begin for the supreme control of the harems; these struggles often lasting for days, the fight being kept up until one or both become exhausted, but is renewed again when sufficiently recuperated for another attack; and, really, the attitudes assumed, and the passes made at each other, equal the amplifications of a professional fencer. The combat lasts

until both become disabled, or one is driven from the ground, or perhaps both become so reduced that a third party, fresh from his winter migration, drives them from the coveted charge. The vanquished animals then slink off to some retired spot, as if disgraced. Nevertheless, at times, two or more will have charge of the same rookery; but, in such instances, frequent defiant growlings and petty battles occur. So far as we have observed upon the Sea Lions of the California coast, there is but little attachment manifested between the sexes; indeed, much of the Turkish nature is apparent. But the females show some affection for their offspring: yet, if alarmed when upon the land, they will instantly desert them, and take to the water. The young cubs, on the other hand, are the most fractious and savage little creatures imaginable, especially if awakened from their nearly continuous sleeping."

Continuing his very interesting sketch, Capt. Scammon says:

"They live upon fish, mollusks, crustaceans and sea-fowls; always with the addition of a few pebbles or smooth stones, some of which are a pound in weight."

It is claimed by some that the Sea Lions at the entrance to the Golden Gate are responsible for the diminished fish supply in the Bay of San Francisco and its tributaries. It is said that quite a large number of the salmon caught on the Sacramento River bear the scars where they have been bitten by their unwieldy enemies. We are to consider, however, that the number of Sea Lions in this vicinity is, at

least, probably no greater than it was before the law was passed that protects these monsters. We are also inclined to think that the large amount of earthy matter, in suspension, continually brought down by the Sacramento from the mining districts, has much to do with diminishing the number of salmon in these waters. Any one who witnesses the wholesale manner in which fish are drawn from the Bay of San Francisco; or any one who has an opportunity of noticing the number of tons of dried fish sent from this port to China by every steamer, will feel inclined to exonerate the Sea Lions in part, at least, from the charge brought against them.

Associated with the Sea Lions we find the Northern Fur Seal (Callorhinus ursinus—*Gray.*) I cannot better do this animal justice than by continuing to quote from Capt. Scammon's very valuable work:

"The Fur Seals have so wide a geographical range, extending nearly to the highest navigable latitudes in both the northern and southern hemispheres, and are found assembled in such countless numbers at their favorite resorts, that they become at once a source of great commercial wealth. * * * Captain Fanning—one of the noted sealing-masters in early times—distinguishes the different ages and sexes as follows: 'Full-aged males, called wigs; the females, clapmatches; those not quite so old, bulls; all the half grown of both sexes, yearlings; the young of nearly a year old, called gray, or silver pups; and before their coats are changed to this shade, called black pups.'

"The color of the full-grown males, or 'wigs,' is dark brown—with scattering hairs of white about the head, neck, and anterior portion of the body—and, in some instances, nearly approaches to black. At a distance, it is difficult to distinguish between an old 'wig' and a full-grown male Sea Lion of the California coast, the former being frequently found measuring nine feet from tip of nose to extremity of posterior flippers. * * When in full flesh, the adult females weigh about eighty-five pounds. * * * The pups, when first born, are about one-third the length of the mother.* They are covered with a thick mat of coarse fur, which changes to a finer texture and lighter shade as the animals mature." * * *

"The flippers of the Fur Seal are destitute of hair, being covered with tough, black skin, similar to shagreen, which is very flexible about the terminations of their extremities; the side limbs are shaped much like the fins of the smaller Cetaceans; the posterior ones have each five distinct toes, or digits, and three nails, or claws, project from the upper sides, four inches or more from the tips, according to the size and age of the animal. The tail is extremely short and pointed. The ears are quite pointed also, slanting backward, and are covered with short, fine hair. * * * The number of whiskers on each side of the face may average twenty; they are of different shades, from blackish-brown to white, and frequently attain the length of seven inches. The eyes are invariably dark and glistening, and have a human-like expression.

*Length of five female seals as given by Capt. Scammon, respectively in feet and inches: No. 1, 4-0; No. 2, 4-7: No. 3, 4-0; No. 4, 4-9; No. 5, 3-6

"The intrinsic value of the animal does not depend upon the price of the skin alone; for the layer of fat adhering to it yields the oil of commerce, and supplies light and heat to the natives in their dismal winter quarters. The flesh, likewise, affords them a staple article of food." * * * * *

"Some idea may be had of their numbers in former years, when on the Island of Masafuero, on the coast of Chili (which is not over twenty-five miles in circumference), the American ship *Betsey*, under the command of Captain Fanning, in the year 1798, obtained a full cargo of choice skins. It was estimated at the time that there were left on the island at least five hundred thousand seals. Subsequently, there were taken from the island but little short of one million skins."

The cemeteries of San Francisco are mostly situated west of the city, and are passed on the way to the Cliff House. To many these "cities of the dead" possess much interest. The tourist who has the time seldom leaves San Francisco without visiting Laurel Hill Cemetery (formerly called Lone Mountain Cemetery, from the fact of its location near the foot of a solitary hill). Here are the finest specimens of mausolean architecture in the State. Ornamental trees of many varieties combine to render the spot picturesque. At the western end of the enclosure is the Chinese Cemetery, which is an interesting locality.

The four principal cemeteries of San Francisco surround Lone Mountain, lying but a short distance from its base, and all within a circle described from

its apex with a radius of a mile. On the north, as we have noticed, is Laurel Hill Cemetery. On the east of the mountain is Calvary Cemetery. This burial ground is the property of the Roman Catholic Church, and contains several beautiful private vaults. On the southern slope of Lone Mountain is an irregular cemetery belonging to the Free Masons; while on the west side is the Odd Fellows' necropolis. The City Cemetery is on the headland, back of Point Lobos, lying along the southern entrance of the Golden Gate. The Hebrew Cemetery is near the Mission. At the old Mission Church (Mission Dolores) is the old Spanish burial ground.

Of these spots, how true are the poet's words:

"Here come the argosies
Blown by each idle breeze,
To and fro shifting;

* * * * * *

Drifting forever here
Barks that for many a year
Braved wind and weather;
Shallops but yesterday
Launched on yon shining bay,—
Drawn all together."

In describing the ride to the Cliff House, we have mentioned the Golden Gate Park. San Francisco has been more backward than many other cities in providing a place where her citizens can enjoy the hours of relaxation amid counterfeit rural scenes. In the early building of the city there was no thought of parks, drives, fountains, architectural monuments, and the numerous similar charms of Eastern cities. The majority of those who came to San Francisco, in its infancy, intended to be mere sojourners. They

came to reap a golden harvest, and intended to carry the fruits of their industry away. But the attractions of climate exercised a strong influence over them, and the few months of their intended stay lengthened into years. They invested their earnings permanently here and built homes in the sunset land. In the rapidly-enlarging city of San Francisco land was considered too valuable to be set aside for mere purposes of recreation and enjoyment.

On April 4th, 1870, an Act which had passed the Legislature of the State of California was approved by the Governor. This was entitled "An Act to provide for the Improvement of Public Parks in the City of San Francisco."* This Act provided that a Board of Park Commissioners should be appointed by the Governor of the State. Their term of office was to be four years. The Act further provided that this Board should "have full and exclusive power to govern, manage and direct these Parks." For these services the Commissioners were to receive no compensation, except the earnest thanks of the people. Well might each, with Hamlet exclaim, "Of the cameleon's dish; I eat the air." The maximum amounts to be expended by the Park Commissioners, according to the provision of the Act creating their office, were—for the first year, $100,000; for the second year, $75,000; and for the next three years, $50,000 per annum. The Commissioners were authorized to issue bonds, bearing six per cent., for the creation of a "Park Improvement Fund," the Park

*Statutes of California, 1869-70.

lands being "pledged as security for the redemption of said bonds."

The lands described in this statute are two parcels west of the densely settled portions of the city, and were each designated on the official map by the word "Park." The larger one of these tracts, which in the Act was called "Golden Gate Park," is a parallelogram, about three miles long and half a mile wide. This Park is reached by an avenue 275 feet wide and 3,834 feet long. The area of the Park is about 1,019 acres. The eastern portion consists of rolling ground, which was covered by a compact growth of shrubby oaks. The western end of the Park is a waste of drifting sea sand of 740 acres. Much has been done to beautify and utilize this unattractive district. Several roads have been constructed through it, and others are contemplated. These highways have been macadamized and brought into excellent driving condition. The hills at the eastern end of the reservation have received much care. The stunted oaks have been trimmed and a large number of other trees have been set out in the openings.

Pines with *eucalypti* and other trees of foreign origin already strikingly diversify the landscape. Beautiful lawns and sequestered arbors exhibit the combined attractions of art and nature. The western wastes have been in a great measure reclaimed. Barley and lupine seed were sown on these drifting sands; the barley soon sprouted under the autumnal rains, and presently the downs were clothed with green; the young plants of the lupine grew more slowly, but, long before the summer winds swept in from the

ocean, a healthy growth of vegetation very effectually checked the drifting of the sands. Trees have since been planted on these barren downs, and it is probable that the time is not far distant when a thrifty young forest will extend along all the Park drives.

The second piece of land mentioned in the legislative Act, previously quoted, is Buena Vista Park, an irregular plat 36.22 acres in extent.* It includes the cluster of high hills a short distance south of the entrance to the avenue of the Golden Gate Park.

At the southern boundary of the "Presidio Reservation," and partly within it, lies Mountain Lake, an irregular sheet of water, about a mile in circumference. On the border of this lake is located the Mountain Lake Public Square, which has an area of 19.93 acres.†

There are several "Squares" in different parts of San Francisco. The most noted of these is Portsmouth Square, with an area of 275 feet by 204 feet 2 inches. July 8th, 1846,‡ "Captain Montgomery, of the United States sloop-of-war *Portsmouth*, then lying in the bay," at the command of Commodore Sloat, raised the American flag "in the plaza, or public square of Yerba Buena." Captain Montgomery was "accompanied by a party of seventy sailors and marines," and a salute of twenty-one guns from the *Portsmouth* proclaimed the occupation of Northern California by the United States. At Monterey, Com-

*Municipal Reports of San Francisco, 1872-73, pp. 519, 520.

†Municipal Reports of San Francisco, 1872-3, pp. 524, 525.

‡Annals of San Francisco, p. 185.

modore Sloat raised the national flag on the same day. On the 10th of July following, the same ceremony was performed at Sonoma, and soon after the Stars and Stripes floated over every settlement in the northern portion of the State. The plaza on which the American flag was first raised in San Francisco* was named in honor of the sloop-of-war *Portsmouth*, and at the same time Montgomery street received its name. To the old Californian many associations cluster around this small open space, almost lost among crowded buildings, and he still calls it *the plaza*. By its side stood the adobe offices of the Alcalde and other early municipal dignitaries. Here stood the first Custom House, the Parker House, and later the Jenny Lind Theater (sold in 1852, for $200,000, to the municipality for a City Hall, which purpose, after being refitted, it has since served). Here were the gambling saloons, in which many a miner, about to leave California for the Eastern States, lost the means of returning home.

A few public spirited individuals have very recently purchased and donated to the city a tract, 275 feet square, on the summit of Telegraph Hill, for a perpetual park. This elevation is dear to every Californian. Early in 1849,† a signal station was here erected, and a well understood system of signals conveyed to the inhabitants the intelligence of an approaching vessel. Afterward the range of observation was extended by the construction of an outer station

*Mention has previously been made of the raising of this flag on the first house in Yerba Buena, July 4th, 1836. It was then raised with the Mexican flag, and now superceded the latter.

†Annals of San Francisco, p. 465.

on Point Lobos, at a later date, September 22d, 1853, an electric telegraph (the first in California) was opened between these two stations. How eagerly have many of the Argonauts of '49 watched for the signal on this hill which should indicate the entrance of another steamer into port. And then how speedily did the anxious exile fall into the long line of equally eager inquirers for letters at "the little Post Office, half way up the hill," which "was almost hidden from sight by the crowds that clustered around it."*

To many the thought of Telegraph Hill recalls the frightful conflagrations† which during about eighteen months successively reduced the business and most densely populated parts of the city to ashes, although new buildings arose before the embers of those destroyed had become cold. Yes, dear will Telegraph Hill ever be to the "old Californian," and he will gladly climb its steep flanks, arm in arm with the new comer, and recount the story of early Californian life, when they have sufficiently admired the extensive view from its summit.

---

*El Dorado, Bayard Taylor, Household Edition, N. Y., 1873, p. 61.

†The extensive fires which devastated the young city in its early days were as follows:

December 24th, 1849—First great fire (although some buildings had previously been burned). More than $1,000,000 worth of property was then destroyed.

May 4th, 1850—Second great fire. Three blocks of buildings destroyed. Loss, $4,000,000.

June 14th, 1850—Third great fire. The ravages of the flames exceeded those of the two previous conflagrations. Loss, $5,000,000.

September 17th, 1850—Fourth great fire. An extensive area of comparatively inexpensive buildings was laid desolate. The loss was from $250,000 to $500,000.

December 14th, 1850—Several stores and stocks of merchandise were destroyed on Sacramento street, below Montgomery. Loss, $1,000,000. This is not usually classed among the great fires of early San Francisco.

San Francisco possesses but one "Central Park." In various districts of the city are located many so called "gardens," where a copious supply of unwholesome liquors is sold and a floor for dancing gives opportunity for that amusement. Woodward's Gardens, containing about six acres, are situated on the west side of Mission street, between Thirteenth and Fourteenth. They are reached by means of street cars. The admission fee to the grounds is twenty-five cents, and admits the visitor to all that is to be seen. Once within the high fence, and strolling among the choice trees dotting the grounds, that are entirely screened from the wind, one observes many interesting objects.

An extensive Museum, occupying the building, formerly the residence of Mr. R. B. Woodward, the proprietor, fronts the main entrance. This building contains a large and valuable collection of zoological specimens from all parts of the world. Here the naturalist will find abundant material for study, while the mineralogist will discover in an extensive collection of Japanese minerals much that will interest him.

Adjoining the Museum is an extended series of Conservatories. In these fairy-like apartments beautiful exotics greet the visitor with sweet perfume, while in one room a wilderness of ferns challenges observation. They are of numerous varieties and

---

May 4th, 1851—Fifth great fire. Eighteen entire blocks and portions of six others were destroyed. In this area less than twenty buildings were saved. The length of the burnt district was three-quarters of a mile, and its width half a mile. Loss, $10,000,000 to $12,000,000.

June 22d, 1851—Sixth great fire. Ten blocks and parts of six others destroyed. Estimated loss, $3,000,000.

—Abridged from Annals of San Francisco.

from widely separated localities. Connected with the largest Conservatory, through which the visitor enters, is a small but select Art Gallery, reached through a vestibule, which is frescoed in imitation of Pompeian art. In this ante-room the numismatist will find objects of great interest.

Near the Conservatories are two large ponds, with rock work at the center of each. Here numerous seals and sea lions live. Here is an opportunity for near observation of their strange habits. Various water fowl live along a small stream running through the grounds.

A feature of great interest to the visitor is the Marine Aquarium. This is not as complete as a few of the more magnificent European ones, but, nevertheless, is noted as being, at the present time, the largest aquarium in this country. Several tanks contain the inhabitants of salt and fresh water respectively, and give rare opportunities to watch the antics of those little-known members of the animal kingdom. A few tanks contain handsome brook trout, and as the visitor watches these speckled beauties securely swimming among the rock-work, a thrill of excitement recalls the pleasures which the angler feels by the still pool in the woods where tall pines shut out the sunlight. Over the Aquarium is a hall, the walls of which are covered with large-sized photographs of California scenery, affording much pleasure either to him who has seen the original landscapes or to him who has those delights yet in anticipation.

A tunnel under Fourteenth street conducts us to the Zoological Gardens. Here are the greater num-

ber of the animals. In this enclosure are a large bear pit and yards for camels, deer, buffaloes and other similar quadrupeds. Many varieties of domestic fowls form interesting groups, while the heterogeneous happy families and the out-door gymnasium are sources of delight to the younger visitors.

Re-entering the main grounds, we ascend by a winding path, along which numerous rustic seats are placed, and, on the summit of a hill, find a pavilion one hundred and fifty feet long, one hundred and thirty feet wide, and fifty feet high. It will seat six thousand persons, while in the center of the hall a smooth, open floor, one hundred and ten by ninety feet, is the scene of numerous acrobatic feats, as well as an arena for dances and skating tournaments.

A part of this building is devoted to the purposes of a restaurant, while tables among the native trees on the hilly slopes offer accommodation to those who prefer to bring lunch with them.

Altogether Woodward's Gardens afford much pleasure and profit to one who spends even a short time there. They also are a credit to the private citizen whose wealth has constructed them.

Across the street from the main entrance to Woodward's Gardens, Messrs. Miller, Sievers & Co. have opened an Exotic Garden. Admission to these very extensive greenhouses is free, and the admirer of plants will gladly avail himself of this opportunity to see the many rare and beautiful specimens of the vegetable kingdom growing there.

Numerous nurseries of plants in different parts of the city will interest the horticulturist, and will repay him for the time employed in visiting them.

A few blocks beyond Woodward's Gardens is the old Church of Mission Dolores. This building has been partly rebuilt, and its front differs from that of the original church. The interior has also been somewhat altered, but still the painting on the walls and many relics of early days recall the times of the early Fathers. Around the old Church sleep many of those who lived here in former times, and as we thread our way among the dilapidated tombstones and falling fences, we notice many holy texts "that teach the rustic moralist to die." One of the epitaphs deserves, perhaps, to be chronicled here:

> "All you that now are standing by,
> As you are now, so once was I,
> As I am now, so you must be,
> Therefore, prepare to follow me."

A few old adobe buildings, with their red tiled roofs, still cluster around the antiquated Church and contrast strangely with more modern surroundings. The Spanish scholar will be much interested in the old records of the Church. One to whom such a treasure is accessible will spend much pleasant time in poring over these quaint and curious volumes.

Five miles south-east from the old City Hall, on the shores of the bay, is Hunter's Point. At this place is a capacious stone Dry Dock, dug out of the solid rock. It is 421 feet long, 120 feet wide at the top, and 60 feet wide at the bottom. It is sunk 22

feet below mean high tide. One can here examine the large China steamers as they lie in the dock for repairs. Near by is a floating dock. The cost of the two docks was $2,000,000. This point may be reached by taking the street cars which run to the Potrero, and by then making use of a light wagon that runs from the Potrero to the docks.

At Clark's Point other floating docks are to be seen.

The tourist will enjoy a forenoon spent at the United States Branch Mint, on Fifth street near Market. Here he will have abundant opportunities of observing the *modus operandi* of money making. The massive and costly machinery will distract his attention even from the glittering coin. In early days, before the establishment of a Branch Mint in this city, several private mints were opened, and did considerable business in providing a circulating medium easier to handle than the then common currency of gold dust. This dust was, in the early days of Californian history, weighed out in payment for value received.

The hotels of San Francisco scarcely come within the province of this work. Yet, a few words in regard to the principal ones may not be considered out of place. Much might be written relating to the old caravansaries which formerly were open to the traveling public. Many interesting incidents took place there, which will not now engage our attention.

The Palace Hotel takes the first place on the list, being one of the largest and best appointed buildings of the kind in the world. The reading public has been treated, *ad nauseum*, to descriptions of this hotel.

Yet, as some may wish to refresh the memory in regard to the more important details of construction, we will state a few facts relating to the building, using, as authority, the survey made in order to obtain insurance thereon.

The building occupies an entire block—344 by 265 feet—bounded by New Montgomery, Market, Annie and Jessie streets. It is seven stories high, with an *entresol* on the New Montgomery street front.

The height of the various stories is as follows:

First	story	.....	27	feet 3	inches.
Second	"	.....	15	" 9	"
Third	"	.....	14	" 7	"
Fourth	"	.....	14	" 0	"
Fifth	"	.....	13	" 6	"
Sixth	"	.....	13	" 9	"
Seventh	"	.....	16	" 6	"

The base of the exterior foundation wall is 12 feet wide, while the bases of foundation of the interior walls vary from 6 to 12 feet in width. "The foundation walls, at their base, are built with inverted arches. All exterior, interior and partition walls, at every five feet, commencing from the bottom of the foundation, are banded together with bars of iron, forming, as it were, a perfect iron basket-work filled with brick. The quantity of iron so used increases at every story towards the roof, and in the upper story the iron bands are only two feet apart."

The entire hotel was constructed "by the day," so that its thoroughness is thereby secured. An idea of the magnitude of the building may be formed, when

it is remembered that, in its construction, 24,660,596 hard bricks, 28,393 barrels of cement, and 22,160 barrels of lime were used.

The building is admirably arranged for protection against fire. The roof is covered with tin, through which all the brick partitions extend. The partitions are so constructed that, if one room takes fire it cannot communicate the flames to others. Four Artesian wells, with a capacity of 28,000 gallons per hour; together with the City Water Works supply a large reservoir, (107 by 64 feet and 20 feet deep) in the basement, which has a capacity of 630,000 gallons. On the roof are seven tanks, constructed of boiler iron, with an aggregate capacity of 128,000 gallons, which supply the rooms in the hotel with water. Several steam pumps, of sufficient size for the work demanded, are used in pumping the water from the wells to the tanks and are also intended for throwing water in case of fire. An extensive fire-alarm communicates from every room in the building with the general office, and registers any unusual heat. "It is the opinion of the Chief Engineer of the San Francisco Fire Department, that with the three large steam fire pumps always maintained in working order; keeping a constant pressure of 140 pounds on the water mains, together with all the extraordinary precautions and most complete fire apparatus ever introduced into any building on the continent, it is an utter impossibility to burn the building, or any adjacent property."

This architectural masterpiece cost, in construction, nearly $3,000,000. To the architect, as well as the

sight-seer, this building is of great interest. Its solid construction, complete equipment, and elegant appointments are very creditable to all who were instrumental in its building. It stands to-day a grand monument to the energetic and public-spirited gentleman—the late William C. Ralston—who projected the enterprise and brought it to a successful issue.

Next to the Palace, the best known hotel in the city is the Grand, situated immediately opposite, on the east line of New Montgomery street. The building is three full stories and a mansard in height. It fronts for 205 feet on Market street, and for 325 feet on New Montgomery street. This hotel contains about four hundred rooms, and by many is preferred to the more imposing structure opposite.

The Lick House fronts on Montgomery and Sutter streets. This is not as large as the neighboring hotels just mentioned, and boasts of less external ornament. This is rather a house for families than for travelers.

On the other side of Montgomery street, extending from Sutter to Bush streets, is the Occidental Hotel, which is also well known and extensively patronized.

In the same block, on the corner of Bush and Sansome streets, is the Cosmopolitan, frequented by business-men, from interior towns, who visit San Francisco for the purposes of trade.

A large hotel, on the corner of Powell and Market streets, is at present in course of construction, and many others may be begun and completed within a few months.

In a work of this class it would be impossible to give more space to the subject of hotels. Further in-

formation in this regard may be gathered from the City Directories, the Traveling Guides, and the regular advertisements in the daily papers, which can inform the stranger in such matters much more accurately and thoroughly than a note-book like the present.

San Francisco has no lack of Places of Amusement. Several theaters of the first order are open together with a multitude of less reputable places of entertainment. The San Franciscans are entertained, to quote the words of Polonius, by "The best actors in the world, either for tragedy, comedy, history, pastoral, pastoral-comical, historical-pastoral, tragical-historical, tragical-comical-historical-pastoral, scene individable, or poem unlimited." A reference to the daily papers will inform the tourist where he can spend his evenings pleasantly.

There are, however, two theaters which the tourist should visit. These are on Jackson street between Kearny and Dupont; one on the north, and one on the south side of the street. The actors in these theaters are Chinese and the plays which sometimes require several weeks for representation are exclusively Oriental, and frequently include the events of a dynasty of several hundred years. The strange appointments of the stage, the costumes and gestures of the performers, and their wonderful acrobatic feats, well repay the visitor for the annoyance occasioned by the incessant din of gongs which accompanies the greater part of the performance. There is no danger in attending these places of amusement. If ladies are among the

visitors, it is better for one of the gentlemen of the party to engage a private-box during the day, by which only a small additional expense is incurred.

The stage is devoid of scenery beyond a few scrolls that are hung against the wall. The orchestra is at the back of the stage in an alcove, each side of which is an ordinary door-way over which hangs a red curtain, that the performers move aside as they enter or leave the stage. At the sides of the stage stand the large trunks in which the actors' wardrobes are kept. A Saratoga trunk is insignificant beside them. By these stand small tables and chairs where some of tho Chinese players are lounging. During the performance one of these rectangular tables, about three feet long and one and a half feet wide, is placed in the middle of the stage directly in front of the musicians. Beside this table one or more chairs are placed. These are substantially made of thick boards. The shifting of "property" is all done by one or more Chinamen, in full sight of the audience. In fact, if the expression may be allowed, every-thing is done "above board." During the play when an actor commits suicide, or is murdered, he lies perfectly still for a moment or two to impart to the spectators the conception that the vital spark has fled, and then he jumps up and runs off the stage. We are reminded, in witnessing such a scene, of the fact that after the culmination of the tragedy, the Hamlet or Richard of our own theaters comes smiling before the curtain, at a summons from the audience. The costumes of the actors are interesting and the remarkable association of colors in these dresses delights the artist. But the play is not all. There is some-

thing more to be seen than the wooing of an Oriental Juliet, or the mock battles in which one is a match for ten thousand. Acrobatic feats are a very striking feature of the performance. All the actors are males and by long study have gained the power of counterfeiting a woman's voice.

The Chinese Temples, or Joss Houses, should by all means be visited. The chief one is on Clay street, opposite Portsmouth Square; it may be entered by any one unattended. If any visitor should be so barbarous as to injure the furniture or ornaments of the temple, a Chinaman, who is otherwise always invisible, will politely usher him down the two long flights of stairs to the street. This room contains some magnificent specimens of Chinese carved work overlaid with gold, as well as beautiful banners of silk, embroidered with figures of dragons and gods in parti-colored silk and gold and silver threads. Elegant specimens of bronze ware also stand on tables in front of the main altar. From these bronzes numerous sticks of incense send up a cloud, fragrant to the Oriental sense. It is also supposed to propitiate the god who, made of paper and elegantly attired, sits in state on a richly carved altar. Any person who will conduct himself in this temple as he would in churches of a faith less strange can gain a very desirable acquaintance with Chinese carving, bronzes, and other tokens of Chinese art.

A detective may be obtained who will take gentlemen, desiring the interesting but somewhat unpleasant visit, through parts of the Chinese quarter which they could not otherwise see. The Chinese quarter is situated in the heart of the city, on Sacramento,

Washington, Jackson and Dupont streets; and for the area of a few blocks the city is a veritable counterpart of China.

The Churches of San Francisco will afford an opportunity to all to attend the services to which they have been accustomed.

Educational and municipal institutions have all necessary appointments. It is not our province to give information in regard to such matters. The limits of this volume forbid such a design.

Reference to the City Directories will furnish much information in regard to the location of various literary, scientific, and benevolent institutions. The intelligent traveler is also always welcomed at the numerous manufactories of the city, and should he desire to witness the fabrication of different products, every courtesy will be extended to him.

San Francisco possesses several large and valuable libraries, at the head of which stands the Mercantile library. The collection of books belonging to the Order of Odd Fellows is next in extent. To this library all members of the Order, and their families, have access. The Mechanics' Institute library stands third, and this like the Mercantile is an institution by subscription. The California Academy of Sciences, to whose rooms all visitors are welcome, possesses valuable scientific works. The California Pioneers own a large number of rare historical volumes; and other societies have books more or less numerous and valuable. Of private libraries we may only mention that of Mr. H. H. Bancroft, which contains about 16,000 volumes relating to the Pacific Coast alone.

CHAPTER IV.

INTO THE HEART OF THE FOOT-HILLS.

"I put aside the forms of men,
And shun the world's consuming care;
Come green and honest hills again!
For ye are free and fair."

IT should be explained that, when the author made his last trip over this route, passengers left San Francisco in the morning, dined at Lathrop, and reached Murphy's about eight o'clock in the evening. This arrangement has since been changed, as will be seen by the Appendix. It has been thought expedient to describe the trip as formerly made, in order that the matter might be more conveniently introduced, especially as the time of departure from San Francisco, as well as the places at which the tourist spends the nights, are frequently changed.

The last morning of May had arrived and many tourists had taken their departure from the city and others were preparing to follow. As far as Stockton we were to travel in company with our friends bound overland to the East. Stepping on board the Oakland ferry boat the journey was begun.

No finer morning for starting on a pleasure trip could have been desired. No fog obscured the pleasing and extensive view. A gentle breeze fanned our

cheeks and roused the tiny wavelets that broke on the rocky shores of Goat Island with a gentle murmur. Looking back at the city sparkling on the hillsides in the welcome morning sunshine we obtained what is probably the best view that it presents. In the foreground lay the convex crescent of wharves at which were moored vessels from every port of the world. Beyond these the eye glanced over long warehouses and streets of stores, behind which rose Telegraph hill. To the south we saw long rows of black foundries and machine shops. The several hills over which the city is rapidly advancing stretched away in the background. Beyond South San Francisco rose the San Bruno Mountains, treeless but covered with verdure. As other ridges rise in the south and their elevation becomes greater the distinguishing tree of the Coast Ranges, the red-wood (*Sequoia sempervirens*), twin brother of the mammoth tree, makes its appearance, at first in straggling clumps but farther on forming dense forests.

Extending between these hills and the spur of the Monte Diablo range usually called the Contra Costa Hills, for a distance of about fifty miles to the south lies the Bay of San Francisco, the ripples that stir its surface glistening in the morning sunlight. The borders of the bay are mostly low marsh lands. These districts further to the south are bordered by the broad and fertile Santa Clara Valley, and on the east and west by two narrow strips of agricultural land that extend from this valley, the one to San Pablo Bay and the other to the "City of the Golden Gate."

To the left of the boat rises Goat Island, containing about three hundred and fifty acres, on which we see

the barracks of the United States troops. Beyond Goat Island (Yerba Buena) is the rock Alcatraz surmounted by the red-brick fort and white light-house around which cluster the numerous buildings used by officers and soldiers. To the west we see the Golden Gate* with the fort on one side and abrupt mountain walls on the other. Beyond, in Marin County, appears the group of mountains, so picturesque to the gazer and enchanting to the rambler, among which Tamalpais, the culminating peak of the group, lifts his dark gray summit.

In front of the boat in the immediate foreground appears the long wharf which the Central Pacific Railroad Company has constructed to reach deep water. Nestling among the *encinals* (oak groves) along the shore we notice Oakland and further south Alameda almost hidden among the oaks (*Quercus agrifolia*). North of Oakland, at the base of the Contra Costa Hills, which form a barrier to the view in this direction, stand the two buildings of the State University facing the Golden Gate.

While we have been admiring the view our point of observation has been steadily moving forward, so that we have now reached the extremity of the "Long Wharf" and prepare to disembark.

We find the train waiting, and a few moments suffice to obtain seats and compose ourselves for the ride. For more than a mile we traverse this long

*Named "Chrysopalœ," or Golden Gate, by Col. Fremont in the "Geographical Memoir of California" (1848). Named on account of the commercial advantages of the bay, before gold was discovered. Had he known of the deposits soon to be found, he could not have named it more appropriately.

wharf, and in doing so see many groups of men and boys fishing from the piles. Reaching land, we ride through the outskirts of Oakland, traversing streets that, with oaks scattered through them, look like country lanes. Pursuing our course, we notice little orchards and grain fields, where farmers are cutting wheat and barley. At a small station on the left, named Decota, is a fine orchard of the Australian Gum tree (*Eucalyptus*), planted here by the Decota Land Company. On the other side of the road extends a broad field of California mustard—a golden sea rippling in the breeze. Our road leads us through similar scenes until we reach Niles, twenty-nine miles from San Francisco. At this place the road turns from the plain, which has an average width of five miles, and we enter by a narrow pass the Livermore Valley. Through this defile the Alameda Creek, at this season a broad shallow stream, winds toward the bay. Its banks are overhung with blooming alders and buckeye trees. The steep hillsides are dry, and the grass looks as if a blighting wind had swept over it. The dry season of California has begun here. In a few steep gullies an occasional yellow or crimson *mimulus*, or bright blue lupine, amid a bed of green grass, adds a pleasing variety to the view.

After winding for twelve miles among these hills, we arrive at Pleasanton, in the border of the Livermore Valley. On our left towers the mountain from which all the ridges around take their name, Monte Diablo. We have traversed one of its spurs—the Contra Costa Hills—and must cross another before entering the San Joaquin Valley. The ascent of this

ridge is very steep and the slackening of speed is perceptible, although two massive engines drag the long train. This is Livermore Pass, the lowest in the Mount Diablo range (altitude 686 feet). Our road lies beneath the summit, through the first tunnel on the Central Pacific Railroad, and on emerging from the darkness, we obtain a fine view of the broad Valley of the San Joaquin. On the hill-sides the ground is perfectly honey-combed with squirrel holes.

Entering the large valley, we find it at this season quite dry, although the river which we shall presently cross is higher than usual. In the middle of this great valley the view is magnificent. About twenty or thirty miles from us on either hand a continuous mountain wall hems in the valley, which extends north and south much farther than the eye can reach. The barrier on the east is hazy and indistinct, and its upper portion resembles an enormously broad white and irregular ribbon lying against the sky. This range, which appears to be only one ridge, is, in fact, formed of many parallel ones of complicated shapes and grand dimensions. These several ridges are not less than seventy miles in breadth. On the west the view is equally fine, the culminating masses of the Diablo Range surrounded by their spurs forming a series of ridges as peculiar as those on the opposite side of the valley. Fading away in the south and lost in the mass of mountains nearer the ocean, the Diablo Range aids in forming the mountainous belt forty miles wide, which extends along the greater part of western California, and is popularly known as the Coast Range.

Eighty miles from San Francisco we cross the San Joaquin River, which is, at this season, quite high. On either side we see low, marshy land. To cross this a trestle-work several miles long has been constructed. At times the water overflows, and without this extensive fabric travel would frequently be interrupted at this point. The bridge and trestle-work are both built on piles driven into the marsh lands. Soon after reaching *dry* land, we arrive at Lathrop, eighty-one miles from our point of departure. Here we dine. Permit me to give a word of advice to those who may travel in California. Always eat when you get a chance, whether hungry or not, for there is no telling when you may have another opportunity.

Lathrop is the point of departure for those that visit Yosemite by the Merced route. A ride of ten miles brings us to Stockton. We notice as we advance that the heat increases to an uncomfortable degree.

At Stockton we leave the Overland train and enter the cars of the Stockton and Copperopolis Railroad. Passing out of the city, we travel directly east for about thirty miles to Milton. For the first few miles the ride is through a portion of the valley that presents a very park-like appearance. The ground is nearly level, and at intervals appear beautiful oaks, in picturesque solitude, or in small groups. These trees attract our attention by their fine masses of foliage, in which a great variety of birds find homes. Leaving the oaks, we emerge at Peter's upon a dry and increasingly undulating plain that becomes more

broken the further we proceed until the rolling land, which takes the place of the plain, gives way itself to the more elevated foot-hills, that are in turn succeeded by the many parallel ridges which make up that grand range, the Sierra Nevada.

The rolling land materially differs from the plain we have left. There the soil was fertile, the oaks thrifty, and beneath these a fine crop of grain was waving its yellow spikes. Here the soil is composed almost entirely of small pebbles, which in the general erosion of the western slope of the Sierra, on account of their greater weight, did not advance as far as the fine particles of soil, and, consequently, remain nearer their points of departure. Nothing grows here, save a sparse covering of stunted grass, upon the seeds of which countless numbers of ground birds subsist. On this land, useless as it may seem, large droves of sheep are pastured during a part of the year. Along the road we notice the rude shanties in which the herders live, while near at hand are the *corrals* where the sheep are gathered.

At Milton we are but three miles from the base of the foot-hills, or, as this particular ridge is called, the Gopher Hills. Stepping from the cars and entering a stage, we soon traverse this space.

The Gopher Hills, a well defined and continuous range, the summits of which are about 1,400 feet above sea level, form an important feature in the topography of this district. Running nearly parallel with this ridge, and about six miles north-east, is another range called Bear Mountain, about 2,000 feet high. At its south-western base lies Copperopolis,

the projected terminus of the railroad. For several miles north-west of Copperopolis, Bear Mountain has along its south-western base an outlying low, but tolerably distinct, ridge of hills, between which and the main mountain a continuous but narrow valley extends.

What was once the great copper mining section of the State lies here almost forgotten. Two nearly parallel, well defined copper veins extend from the Calaveras to the Stanislaus rivers, one following the narrow valley between Bear Mountain and the neighboring ridge, and the other, which is more irregular and less valuable, extending along the Gopher Hills.

The most valuable portions of each of these ledges are at the eastern extremity. These, as in the case of most copper deposits in California, are not regular fissure veins, but appear to contain independent masses of metal. They do not exhibit all the characteristics of true veins, but the deposits are frequently of enormous dimensions and great purity.* Now that the copper excitement has subsided here, these mines are almost valueless and are mostly abandoned. In 1864, 14,315 tons of copper ore, valued at $1,094,660, were shipped from the State, of which the greater portion came from these mines.

Copperopolis was the trade center for this region. Large stores, extensive hotels and costly hoisting works arose above the dry plains with scarcely less rapidity than Aladdin's famous palace. The great expense of transporting the ore to where it can be worked has now rendered the mines worthless. Ex-

*See Geological Survey of California. Geology, Vol. 1, p. 255.

tensive fires have swept over the place, removing all traces of many of the largest hotels and stores, and were it not for the dryness of the soil, grass would grow in the streets. To-day Copperopolis mourns over the bright days of past prosperity, while the "dead-broke" miners, who are unable to get away, congregating in the bar-room of the shabby hotel, talk over incidents of former times, discuss the merits of respective shafts and long for a renewal of their previous success. As they sit beside the round baize-covered table, on which lie a greasy pack of cards and a few newspapers at least a week old, and as they talk over their bright imaginary prospects, the lusterless eyes of these men occasionally gleam with something of the old light of their former enthusiastic and reckless life.

Between the Gopher Hills and Bear Mountain extends a valley from four to six miles wide and at an elevation of about 1,000 feet above the sea. This, on account of numerous alkaline springs in various portions of it, has been named Salt Spring Valley. Near Copperopolis it ends, being there succeeded by low hills that are separated by a confused number of steep and narrow gulches. At the other end, near the Calaveras River, the valley also rises into hills.

Our road leads us over the Gopher Hills, across the Salt Spring Valley in its broadest place, and then over Bear Mountain; as we cross the first ridge the view is good, but it is not so fine as from the second range. From the summit of the former, looking behind us, we see Milton, which consists of a few buildings grouped at the railroad terminus. The heat in

this so-called town is intolerable, there not being a tree or shrub in its neighborhood to form a shelter from the sun's rays. As we look upon it, we see the hot air rising from the plain as from a furnace. At our left, in regular rows, as the ledges of rock are followed, between which some moisture may be retained, grows the nut-pine—that representative of the cone-bearing trees which is found along the dryer portions of the western slope of the Sierra.

"The nut-pine (*Pinus Sabiniana*) is remarkable as a conifer for its spreading top, and for its large cones full of edible seeds. It branches out somewhat after the manner of a maple; is rarely more than sixty feet high, though often with a trunk four feet in thickness—a thickness of trunk that with most conifers would give more than double its height. About half way from the ground to the top, the trunk divides into a number of branches, which grow upward. * * * The seeds are larger than the common white bean and are very palatable, with a slight terebinthine taste. The leaves are from four to ten inches long and grow in groups of three. The foliage of the tree, when seen from a distance, resembles that of the willow, both in color and distribution."* The Indians subsist in a great measure on the seeds of this tree, so that in some sections of the State it has been called the "digger pine."

Descending the Gopher Hills and entering the Salt Spring Valley, the first object that greets our eyes is the Salt Spring Valley Reservoir. Here is collected water to be used for the purposes of mining and agri-

*Resources of California. J. S. Hittell, S. F., 1874 p. 358.

culture. The water-shed being so favorable to accumulation of the fluid a comparatively short dam is required to form this large artificial lake. Whenever the owners choose to raise their dam to the height allowed by their charter, it is estimated that this sheet of water will not cover less than 1,600 acres and will be over thirty feet deep in the center.

Riding through Salt Spring Valley we notice numerous veins of a thin-bedded, fine-grained and agrillaceous slate. These veins are exposed to a height of two or three feet above the surface and run parallel with the ridges on either hand. This slate frequently divides readily into very thin sheets. The thinnest bedded varieties are exceedingly fragile and their structure is frequently wavy. In some places the rock possesses sufficient strength to be used for roofing. It is said that at one time in the southern portion of this valley considerable capital was invested in the working of these slate mines, an industry which, according to report, is about to be renewed.

We can easily perceive the manner in which this valley has been formed. During the age of erosion, perhaps when the great ice sheet began to melt, that once overspread the entire Sierra to an immense depth, the soil which for two or three thousand feet in depth covered this section, was carried down to fill up the great inland sea and form the valleys of the Sacramento and San Joaquin. The slates of this valley, less solid than the harder and more metamorphic rocks of the hills on either side, were more easily eroded and carried away.*

* See "Salt Spring Valley and the Adjacent Region in Calaveras County," W. A. Goodyear. Proc. Cal. Ac. Sciences, Vol. III, pp. 387-399. Subject very fully treated.

Before beginning the ascent of Bear Mountain we pass through Tower and Bisbee's Ranch—the most fertile portion of the valley. In the other parts the soil is shallow and very poor, being strewn with small and partly rounded quartz pebbles. Even the dry grass of the San Joaquin Valley is not found there. On this ranch, however, a good quality of fine hay is raised. But, owing to the dryness of the air, it is necessary to stack this in very large cocks until it is baled, in order to prevent its becoming too dry and brittle for use.

As we wind up Bear Mountain the vegetation constantly changes. Oaks and nut-pines are around us, while occasionally we notice a yellow pine. (*Pinus ponderosa*). The view becomes more and more extensive, first embracing the Salt Spring Valley in its whole length and breadth, a large ranch on the one side and an extensive reservoir on the other. But, as our point of view becomes more elevated, we begin to look beyond and over the Gopher Hills upon the broad Valley of the San Joaquin. At the summit of Bear Mountain the view is particularly fine. Behind us lies the valley through which we have just passed, bounded by the hills, beyond which extends California's lower great valley. In some portions, more particularly at the upper end, we see an undulating green expanse which closely resembles the distant bay. It is not without difficulty and the use of the field glass that we are convinced that this mass is an ocean of green oaks. On the western border of the broad expanse stands Monte Diablo—monarch of the plain. Just beyond, blue against the bluer sky stretches the long, wavy ridge of the Coast Range.

Before us how different the view! A great district of the Sierra ranges extends before the eyes like a grand panorama. The foreground consists of pine-clad hills that, in the distance, give place to high peaks where the fleecy snow lingers alike in July and in January. Easily distinguished among the mass of lofty summits stands "Clouds' Rest," at the foot of which the Yosemite Valley nestles among the mountains.

At our present stand-point we are but a few feet less in altitude than at Murphy's, yet to reach that place we are obliged to descend this mountain and cross still another range of hills. In the valley we change horses, the four that we have thus far had having brought us about half way—seventeen miles—on our journey from Milton to Murphy's. With fresh horses we easily cross the remaining ridge that lies before us.

On our descent we pass through Altaville, situated in a steep gulch, through which the road runs, while a row of houses extends on either side. This place was once of some note, but now scarcely merits a passing notice. Still farther down the ravine we observe many places along its sides where the red soil has been digged over in search for particles of gold. We soon reach Angel's Camp. Numerous quartz mills around the town indicate a former thrift that it no longer possesses. We were informed that in 1861, thirteen of these mills were working in the immediate vicinity. We stop long enough to change mails, the general distributing office of this section of the country being located here. While waiting

we stroll through the building, which, at the same time, is post-office, express-office, grocery, and also drug, seed, and hardware store. The back door opens upon a porch overhung with vines; between this and the hill-side opposite, flows a small stream, which trickles musically over the stones. On the hill-side lives the proprietor, who, as his shop indicates, is a model of neatness and order. His home is surrounded by grape vines and fruit trees, which are irrigated by trenches running along the hill-side.

We may here remark the superiority of the fruit raised on the foot-hills, in what is called the gold belt, over that produced in the valleys near San Francisco. In the former localities the fruit sometimes is not so large, but what is lost in size is more than made good by the superiority of flavor. Flowers, also, particularly roses and oleanders, thrive on the red soil of this district better than anywhere else in the State. We have seen oleanders, near the Tuolumne River, that were eight and ten feet high, and completely covered with blossoms, which freighted the air with sweet perfume. So dense was the mass of bloom that the leaves were scarcely to be seen among the dense clusters of pink flowers. And this was out of doors where, at some seasons, the frosts are very severe.

It will be interesting to some tourists who have read Bret. Harte's poem addressed "To the Pliocene Skull," which begins:

> "Speak, O man, less recent! Fragmentary fossil!
> Primal pioneer of pliocene formation,
> Hid in the lowest drifts below the earliest stratum
> Of volcanic tufa,"

to know that we are now within two miles of the place where that interesting relic was exhumed. Professor Whitney thus writes of this fragment of a human cranium:* "The skull was found at a depth of about one hundred and thirty feet, in a bed of gravel five feet in thickness, above which are four beds of consolidated volcanic ash, locally known as 'lava,' these volcanic beds are separated from each other by layers of gravel. * * * * A careful inquiry into all the circumstances of the alleged discovery, and an interview with all the persons who had been in any way connected with it, impressed upon my mind the conviction that the facts were as stated above, and that there was every reason to believe that the skull really came from the position assigned to it. * * * * This relic of human antiquity is easily seen to be an object of the greatest interest to the ethnologist, as well as the geologist. The previous investigations of the Geological Survey have clearly demonstrated the fact that man was contemporaneous with the mastodon and elephant, since the works of his hands have been repeatedly found in such connection with the bones of these animals that it would be impossible to account for the facts observed on any other theory.† * * But in the case of the skull now laid before the Academy, the geological position to which it must be assigned is, apparently still lower than that of the mastodon, since the remains of this animal, as well as the elephant, which are so abundantly scattered over this

*Proceedings California Academy of Sciences. Vol. III, pp, 277-278.

†See that portion of Chapter XI, which relates to the region around Table Mountain, Tuolumne County.

State, are always (so far as our observations yet extend) limited in their position to the superficial deposits, and have never been found at any considerable depth below the surface. There is every reason to believe that these great proboscidians lived at a very recent date (geologically speaking), and posterior to the epoch of the existence of glaciers in the Sierra Nevada, and also after the close of the period of activity of the now extinct volcanoes of that great chain. In fact, they belong to the present epoch. The bed, on the other hand, in which this skull was found, must have been deposited at a time when the volcanoes of the Sierra were still in vigorous action, and, as it seems to us highly probable, from a careful consideration of the geological structure of the region, previous to the glacial epoch of the Sierra, and also previous to the erosion of the cañons of the present rivers."

A short ride brings us to Vallecito (Little Valley). Here are situated numerous deep mines—the gold being found beneath three layers of lava. This mining camp was in its most prosperous condition in 1852 and 1853. On the left side of the road, for quite a distance, we see a cliff of volcanic breccia, a portion of the great lava flow that at a former time occurred in this region.

Two miles before reaching Murphy's, the end of our journey, we pass through Douglass Flat, at which place a particularly fine field of grain appears in striking contrast to the reddish hill-sides that nearly enclose the little valley. The sun is fast sinking behind Bear Mountain, producing strange effects as

it lights up the fleecy clouds and shines through the varied foliage on the mountain top. The blushing clouds are quickly changing to a slatey color, and then to a black hue. The stars begin to twinkle, and as the moon serenely glances over the hill-tops, we enter Murphy's, and the day and our journey have closed together.

CHAPTER V.

CALAVERAS COUNTY.

"All hail to the grand old mountains,
With their green and glittering dress,
Fit type for a youthful country,
In its pride and loneliness."

WE ARE now in Calaveras County, which we entered when we descended the Gopher Hills into the Salt Spring Valley. It may, therefore, be well for us to have a general idea of the country before going further. Calaveras is separated from Amador County on the north-west by the Mokelumne River; and is bounded on the east by Alpine County. On the south-east it is divided from Tuolumne County by the Stanislaus River; while the two counties of San Joaquin and Stanislaus form the western boundary. It derives its name from the Calaveras River, which drains the entire region lying between the Mokelumne and Stanislaus. The name, Calaveras, originally meant a skull. Calaveras County is shaped much like a pear, the base being the south-western boundary. It contains 1,140 square miles, of which, from the scarcity of water, only 98 are agricultural land. The bounding rivers are the only permanent ones, except some small streams which are confined to the high mountain region. The Calaveras River,

as well as the San Antonio, although a large stream in spring, is entirely dry late in the year. The water of the former is almost exhausted for mining purposes before it reaches the foot-hill section. When this supply fails, the miners are obliged to have recourse to the extensive system of ditches that conveys water from the highest mountain districts.

The entire county is mountainous. Bear Mountain, which extends from the Stanislaus to the Mokelumne, divides it into two portions. The district on the south-west belongs to the foot-hill section, while the second division forms a part of the Sierra proper. A portion of the latter region, about twelve miles east of Bear Mountain, was once one of the richest gold mining sections of the State. As there is a tolerably abundant supply of water for the purposes of irrigation, a part of the land is quite well cultivated, and in certain places produces excellent fruit.

An extensive limestone belt extends through Calaveras County, which appears to be made up of numerous immense, detached masses, entirely severed from each other and lying in an east and west direction. This detachment has probably been caused by the great physical disturbances which have occurred in this section. The limestone belt is first seen near Douglass Flat, then at Murphy's, and again at Cave City. How much farther it may continue we cannot say from personal observation.

The limestone at Murphy's projects from the surface of the earth to a great height, and in an exceedingly picturesque manner, at the east and north of the town. This is the naked expanse of bluish-gray

rock visible from the hotel. The same belt extends beneath the town, and may be seen around it wherever the soil has been washed off. Upon examination we find the rock of a light bluish-gray color, in striking contrast to the reddish-brown of the auriferous slate-formations, as well as to the universal red dirt which covers it, and which occurs throughout the gold bearing belt. The rock which lies in the valley is worn into deep cavities by the action of water. How long ago this was done it would be difficult to determine. In these natural "riffles" lies the golden *detritus*, and from these little cavities large amounts of the precious metal have been taken. While the processes of Nature's hydraulic activities were going on, this was one of her ground, or, more properly speaking, rock sluices, through which the soil from the regions around was carried down to fill up a great inland sea and form the broad plain between the Sierra Nevada and the Coast Range.

At Murphy's the limestone belt is about a mile and a quarter wide. Its southern boundary is slate, which contains several quartz veins. This slate dips to the north-east at an angle of about 70°. On the northern boundary the limestone passes through an intermediate stage of calcareous sandstone into a silicious slate. Near the line of contact between the limestone and the slate extensive deposits of hematitic iron ore have been discovered. A remarkable characteristic of the limestone in this vicinity is the gold-bearing quartz veins that it contains. Some of these have been found of sufficient extent and value to warrant working.

Murphy's lies in a little valley nearly surrounded by the red hills of the region, on which grows the manzanita, together with pines, and occasionally an oak. As might be inferred, it was at one time a place of considerable importance. The various kinds of mining in the neighborhood had the effect of building up a town, that had as bright prospects of future wealth and importance as almost any other in the State. The pockets in the limestone are nearly exhausted, the quartz veins do not pay sufficiently to warrant great expenditures in opening them, and agriculture is not generally followed. Fire also has endeavored to destroy the town, and Murphy's stands a shabby memorial of the illusive hopes of its early days. The only edifice of importance in the place is the hotel, a large two-story brick building with iron shutters.

It is about sixteen miles from Murphy's to the Mammoth Grove of Calaveras. In accomplishing this distance we rise about 2,300 feet. The road follows Murphy's Cañon for about three miles and then winds over rolling hills and along the sides of pretty valleys for the remainder of the distance. The cañon road is quite steep, and the scenery is charming indeed. Below the road, in the cañon bed, flows a copious stream over which droop many beautiful trees, shrubs, ferns and flowers. The side-hills are steep and are covered with a fine growth of trees, mostly coniferous.

Let us examine a few of the trees around us, as they are such as we shall frequently see in other portions of the State, and the sooner we learn to recog-

nize them, the more varied will be the pleasure of our journeyings.

The most stately tree of all, next to the mammoth and red-wood, is the sugar pine (*Pinus Lambertiana*), which closely resembles the white pine (*P. strobus*) of the Atlantic States, though "like all the conifers on the Pacific Coast, it exhibits a symmetry and perfection of growth not attained by the trees of any other part of the world."* This tree has been known to reach a height of three hundred feet, and a diameter of twenty, but its ordinary height is about two hundred feet. A sweet resin, that can with difficulty be distinguished from the manna of the drug-store, exudes from the hard wood and gives a name to the tree. This tree, perhaps better than any other, exhibits the prevailing characteristic of the cone-bearers, the great development of the trunk at the expense of the branches. Almost the whole growth is confined to the trunk, and this stands as free from flaws and as perpendicular as the columns that support the *façade* of some massive temple raised by man in imitation of the grander handiwork of Nature. As we walk or ride among the trees, where their giant trunks stand near together, and the mingling boughs largely shut out the sunlight, it is not difficult to imagine that we are strolling through some Egyptian city of the past, where "Nile reflects the endless length of dark red colonnades." The slender branches above, the sparse foliage, and the cones, frequently eighteen inches long by four in thickness, suspended from the extremity of the

*Dr. Newberry.

limbs in small clusters, all produce a very striking effect. The leaves are of a dark bluish-green, about three inches long, and grow in groups of five. The wood, which is used to finish the interior of houses, is similar to that of the white pine. It is white, soft, straight-grained, free from knots, and splits freely. This is the chief building material of the Sierra Nevada.

The next tree in stateliness, found both in the Coast Range and the Sierras, is the Western yellow pine (*Pinus ponderosa*), which is sometimes found seven feet in diameter. The leaves, which are a dark, yellowish-green, grow in triplets, forming tufts at the ends of the branches that give the foliage a very peculiar appearance. The bark is of a light yellowish-brown color, and looks something like cork. It is divided into smooth plates, which are from twelve to twenty inches long, and from four to eight wide. The yellow pine is valuable for lumber, and also for the turpentine that exudes when the tree is cut.

On the hill-sides we see that distinguishing shrub of California, the manzanita (*Arctostaphylos glauca*). This grows in the coast valleys and up to the limits of perpetual snow in the Sierra Nevada. This shrub is very dense, and is sometimes as high as twelve feet, with almost the same width. The trunk, which is extremely crooked, divides near the ground into several branches that terminate in a countless multitude of twigs. On these sprays grow thick, shiny, pea-green leaves which, in shape, are oval, about an inch and a half long, and set vertically on the stems.

The branches are very crooked, and it is with the greatest difficulty that a straight piece of proper size for a cane can be found. The wood is very dense and hard, and dark red in color. The bark is smooth and red, forming a pretty contrast to the leaves. This sometimes peels off and shows the new light-green bark, which soon turns to the color of that which is older. The flowers are pinkish-white and grow in clusters. The berries, which are food alike for the grizzly and the Indian, are round, red, and half an inch in circumference. These berries have a pleasant acidulous taste, and in appearance resemble miniature apples, from which the shrub derives its name, as manzanita, in Spanish, means little apple.

On the banks of the creek grows the "buck eye" (*Æsculus Californica*). This is a spreading shrub, found on rocky ledges, in steep ravines, and along the banks of streams. It grows to the height of fifteen feet, and its dense foliage presents the contour of a hemisphere. The leaves grow in sets of five on a stem. The shrub is covered from early spring to late fall with flowers, which are white, arranged on a crescent-shaped stalk, and diffuse a very agreeable odor. The fruit is large and plentiful.

The water which we see, first on one hand and then on the other, has been brought fifty miles, to serve the purposes of mining and agriculture. It is conveyed in ditches for the greater part of the distance. Here, however, the bed of a former stream has been utilized, to save expense. These ditches belong to the Union Water Company, which has its office in Murphy's.

Ditches are the arteries through which flow vital currents, without which large portions of California would be of little value either for mining or agriculture. The ditches in this county alone are over three hundred miles long, and have cost in construction more than two million dollars. In the valleys and foot-hills of the Sierras, the stratification of the rock is nearly perpendicular, so that all moisture sinks to the lowest levels, and goes to form those underground water-courses from which Artesian wells draw their supply. As the season advances, almost all the water through this section disappears, and the land becomes dry and parched, till the coming of the rainy season. The auriferous belt, where most of the gold has been found in placer or hydraulic mines, lies in this region. To work these mines an abundant supply of water is of paramount importance. How is this to be obtained? The only way is to convey it from sources high in the regions of perpetual snow. This has been done by flumes and by ditches. The former means are more expensive and less satisfactory than the latter. The lumber of which a flume is constructed costs more than a trench in the ground, and while a flume is growing weaker day by day, a ditch is constantly improving. A flume is a box of rough boards, generally about four feet broad and three deep; at intervals of four feet it rests on a sill four inches square, and its sides are strengthened by two upright stakes of the same dimensions, mortised into the sill. These stakes are bound together, and the whole structure made strong by caps ten inches thick and four wide, which are mortised on the side

supports. When a cañon intervenes, it being necessary to carry the flume in nearly a level position, a sustaining framework is required. This is built much like a railroad bridge in a similar position, although not so strongly. Some high flumes, as these structures are called, are more than two hundred feet above the gorge below, and those which have not been broken down by the winds and snows, now stand as conspicuous specimens, both of engineering skill and useless extravagance. Iron tubes, made in the form of inverted siphons, are now used in these localities, and as they lie against the ground, the snow cannot break them down. The iron pipes are in the first place cheaper, and when we consider the expense of repairs and the frequent entire reconstruction of wooden flumes, we can only wonder that people have for so long a time expended thousands where hundreds would have been equally efficient.

A ditch is a deep, broad trench, cut along the mountain sides and around the heads of ravines, to serve the purposes of a flume. For the first few years much trouble is experienced, as the water escapes through the loose soil and numerous squirrel holes. Great vigilance must, therefore, be exercised. But as the ditch becomes older, the ground under and around it grows more and more compact, and the squirrel holes are filled, so that the loss of water is, at least, no greater than from a flume. The seeds of pines and other trees and bushes, blown by the wind or lodged from the water, take root and grow into fine trees, frequently forming a perfect hedge. The roots serve to bind together the soil and make

the ditch more secure from year to year. In a flume, unless the water is constantly running, the sun so warps and cracks the boards that the structure is rendered useless, while a ditch may remain dry for months and suffer no such injury.

A flume under the most favorable circumstances will last only about ten years, and must then be renewed. A ditch, on the other hand, if it receives proper care, will remain a permanent feature of the landscape.

As before mentioned, for about three miles after leaving Murphy's, we ascend a picturesque ravine. The water of the creek rushing over its polished rocky bed, the drooping dog-woods, maples and buckeyes along the stream, the tufts of giant ferns growing amid the sparkling waters, the steep hill-sides clothed with dense pines and manzanitas, vividly contrasting in color with the red earth, all these form a picture of striking beauty. After leaving this cañon the road forks, but either branch will take us to our destination, and both lead over the rolling mountain land and along the sides of quiet valleys. At some points the view is very attractive, and at the summit of one hill we see at a glance a great part of central California.

Having taken this trip (Murphy's to the Grove) in the public conveyance, as well as on foot, it was with pleasure that the writer accepted the invitation of a San Francisco gentleman to travel over this road by night in a private carriage. Starting at half past six, the ride through the ravine was made during the twilight and presented no unusual attractions. At

the half-way house we waited about an hour for the full moon to rise before taking the remainder of the journey through the deep forests. Poetry only can portray the impressions of sublimity and beauty received in the course of a moonlight journey through Californian forests.

> " Shapes which have no certainty of shape,
> Drift duskly in and out between the pines,
> And loom along the edges of the hills,
> And lie flat curdling in the open ground."

CHAPTER VI.

CALAVERAS MAMMOTH TREES.

"Here aged trees cathedral walks compose,
And mount the hill in venerable rows."

THIS Grove is situated in Calaveras County, near the line of Tuolumne, in a small valley which extends in a north-west and south-east direction. It includes ninety-three mammoth trees (*Sequoia gigantea*) and more than one hundred sugar pines (*Pinus Lambertiana*) and yellow pines (*P. ponderosa*). It occupies a belt 3,200 feet in length and about 700 feet in breadth, at an elevation of 4,759 feet above the sea. The Calaveras Grove and the South Grove, seven miles distant, are private property.

The San Antonio, one of the largest streams of Calaveras County, flows at the distance of a mile north of the hotel which adjoins the former grove. The scenery on the banks of this creek is often beautiful, and is especially attractive at one point where there is a water-fall about 150 feet in height.

The first view of these trees is generally attended with extreme disappointment. They by no means equal expectation. But, as the observer becomes familiar with them, his chagrin subsides. If he measures their circumference, or, lying upon his back,

looks up noticing that he is obliged to look long and repeatedly before the height of their towering summits is properly comprehended, he will begin to appreciate their huge dimensions. His disappointment is the result of various causes. The trees are so admirably proportioned that they do not appear as large as they would were they less symmetrical. The surrounding sugar pines are giants of their kind, and do not afford as correct measures for comparison as pines of the usual size would supply. The longer one lingers among "these giants of the ancient world" the more completely does the feeling of disappointment give way to impressions of mingled awe and admiration.

The full grown *Sequoias* are not the only representatives of their species that here abound. Numerous young trees—perhaps a thousand years old—stand near the border of the grove. While groping among the undergrowth, which in some places is quite thick, I found infant trees, from one to three feet in height, of such a size as those that are sold in the nurseries of San Francisco. If these youngsters are not arrested in their development, they will, in ten or twenty centuries, reach very respectable dimensions, and will become worthy successors of those now standing in full vigor, or, by tardy decay, returning to their mother earth from which they have been as slowly reared.

The soil of the little valley is very fertile. Where the sun sheds his rays through small openings in the roof of green, beautiful wild flowers spring into life and brighten the sombre vistas of the forest. In

cool spots where the ground is moist, and even on dryer hill-sides, the Snow plant (*Sarcodes sanguinea*, Torr.) appears, which is allied to the Beach-drops (*Orobanche*) of the Eastern States. It pushes through the loose soil its fleshy pink-white stalk, surmounted by slightly drooping cup-shaped flowers of a blood-red color.

The dog-wood (*Cornus Nutallii*) supplies another attractive feature to the grove. It is a tree from ten to fifteen feet in height, with bright green leaves and small flowers, which are surrounded by broad, white and showy bracts. The dog-woods are abundant beside some of the paths in the grove near the hotel, and alleviate the dark shadows, which, even at mid-day, suggest the approach of night.

While strolling through the grove, one is pained by observing that many trees bear marble tablets on which the names of generals and politicians of ephemeral notoriety have been inscribed. Why should these living monuments, reared by the hand of Nature to commemorate past ages, be connected also with the memories of our little-great men? Heaven forbid that these glorious trees should continue to be made bulletin-boards upon which are emblazoned the names of those who have won a transient renown on the field of war or the arena of politics.

A walk of about one hundred and eighty yards brings one to the first *Sequoia* of note—the "Pride of the Forest"—situated on the right hand side of the path. This tree is forty-eight feet in circumference and one hundred and eighty high.* Although

*All the measurements of trees in this grove are taken from the report of the State Geologist. The circumferences were measured six feet above the ground.

smaller than some of its companions, a healthier and more noble tree cannot be found in the grove. To the right lies what remains of the trunk of a prostrate giant, the greater portion having been transformed into pretty little mementoes of the spot that are taken away by visitors. On our way hither, about sixty yards back, we passed under a trio of trees that bear the names of noted generals.

The next tree of interest is the "Miner's Cabin," which in November, 1860, yielded to the fury of the tempest. About one hundred and fifty feet from the roots this tree fell across the trunk of one that may have lain there when sturdy pioneers were disembarking on the bleak, inhospitable shores of New England.

The "Three Graces," that have been extensively represented by engravings and photographs, are conceded to form the finest group in the grove. They are ranged in a perfectly straight line, and are noted alike for height and symmetry. Each is about thirty feet in circumference, while the tallest is two hundred and sixty-two feet high.

Some little distance farther on stands a tree forty-eight feet in circumference and two hundred and sixty-two feet high, bearing the name of "William Cullen Bryant," together with the legend, "The groves were God's first temples." This tree has been injured by fire to a great extent, and several apertures in its trunk, over which the bark has partially grown, are large enough to admit a full grown man.

In about the centre of the grove we find the "Pioneer's Cabin," one of the largest trees. The entire heart has been burned out for a considerable height,

and only a comparatively small shell supports the immense weight of the massive trunk. On one side, near the top of the blackened cavity, an opening has been burnt. Where this hole now is a branch probably once existed, which in the conflagration was entirely destroyed. Standing within this tent-shaped opening and looking first through the entrance upon the thrifty young trees at hand, and then through the "chimney" at the blue sky, framed in a border of green boughs, one may see that this tree has not been inappropriately named. A short distance to the right stands "Pluto's Chimney," the north side of which has been hollowed out by fire for a height of ninety feet. Scarcely more than one-third of the base section remains, yet the branches are thrifty, and viewing the uninjured side one would pronounce this one of the best preserved trees in the grand old Sequoia Grove. Near the "Pioneer's Cabin," on the west, stand two vigorous trees of the same species, each about seventy-five years old, while around it are many older ones that mingle with pines, cedars, and firs, forming a varied and beautiful spectacle.

When we have walked about two hundred and fifty feet further we find, on the right, the uprooted base of a mammoth trunk that appears to have lain there for centuries. The log is now eighteen feet in diameter without the bark, which long since mingled with the fertile soil around it. This has been called the "Fallen Monarch." Who can say at what time in the distant past some angry tempest hurled to the ground this forest-king that for so many cen-

703122

turies breasted the fury of the storms? Where the top must have fallen, pines stand that now seem fast approaching the noon of their life. As we stand upon the prostrate trunk more than a dozen *Sequoias* are visible, their reddish-brown trunks beautifully contrasting with the brilliant green of the young firs that surround them.

We now approach the north end of the enclosure, beyond which only three unimportant mammoth trees are found. Before us, just here, is the "Mother of the Forest," three hundred and fifty feet high, which, though destitute of bark, measures sixty-one feet in circumference. This tree ranks third in height, lacking but ten feet of being as tall as the loftiest of the grove. It stands first in size of trunk. The bark, which is said to have been eighteen inches in thickness, was stripped from the tree for one hundred and sixteen feet, by a Mr. Gale. The only excuse for this act of vandalism, which soon caused the death of the finest tree in the grove, is that he wished to exhibit the bark in the East. On one of the topmost branches a small tree, supposed to be a sugar pine, has sprung, and is endeavoring to draw life from the dead and bleaching trunk.

The "Mother," with naked, outstretched arms, and with portions of the scaffolding that was used in her destruction still cleaving to her sides, stands, in seeming mute appeal, that her children, who cluster around, may be protected from the ruin that has fallen upon herself.

We stroll along, and reaching the roots of the prostrate "Father of the Forest," pause to look around us. Glancing back over the path we find the

view obscured by the dense shadows of giant trees, while in the distance stands the "Mother," her bare, white arms and scathed trunk painfully visible against the green background.

Around us is the densest portion of the grove, and *Sequoias* only are to be found in the immediate vicinity. The "Father of the Forest" probably fell centuries ago. In falling, at the height of about three hundred feet, he struck the trunk of another tree, and at that point all trace of the top disappears. Some maintain that the "Father," according to the general rate of tapering observed in his companions, was not, when uninjured, less than four hundred and fifty feet high. The State Geologist, however, taking the height of the tallest standing tree—three hundred and twenty-five feet—as a basis, argues that it is not likely that this one towered one hundred and twenty-five feet above his compeers. For a distance of about two hundred feet one is able to ride on horseback through this trunk, which has been burnt out, and emerge from a knot-hole, that has been slightly enlarged, the height, but not the width, being somewhat increased.

Several children of this great tree shelter his fallen trunk. These form the "Keystone State Group," of which cluster the "Keystone State" is the tallest tree upon this continent that has been accurately measured.

Passing on we come to a tree that, until it fell, in 1862, was the largest standing of the grove. This tree—"Hercules"—leaned about seventy feet from the perpendicular, and fell across the little rill that

meanders through the grove, striking against the hill-side with such force that the top is completely shattered. A long ladder takes us to the top of the trunk, and the view fully repays the exertion of climbing. One can have no idea of the size of these trees until he stands on the side of a fallen one and looks at the ground beneath. It is quite a walk from the roots to the top of this tree along the trunk, and back. We would have to perform this task only eight times to walk a mile.

We follow the beaten track back to the hotel, and in doing so pass many large trees that want of space does not permit us to mention individually. Less shaded than that on the other side of the valley, this path is very pleasant. We notice in many places beautifully painted butterflies dancing merrily on the sunbeams.

On our way back we reach the main wagon-road to the hotel and walk between the "Sentinels," which are only far enough apart to allow a carriage to pass. They incline at a gentle angle toward each other, and their tops almost meet.

Near the "Sentinels" stands the "Stump-house," erected over the stump of the tree that was cut down at the same time that the "Mother of the Forest" was robbed. This tree, which was probably the largest in the grove when it was discovered, was felled by another act of forest sacrilege. After having been severed from the base with great labor, by boring with pump augers, the trunk refused to fall, and wedges were driven in to throw it off its balance. So evenly poised was it, however, that after

a work of three days in driving wedges, the wind did what man had failed to accomplish, and the mighty tree lay on the ground a shattered wreck.

The stump, when leveled off, was found to be twenty-four feet one and a half inches across its longer, and twenty-three feet across the shorter diameter.

By the "Stump-house" lies the "Chip-of-the-Old Block," a portion of the base section of the fallen tree. This chip is about thirty feet long and twenty-four feet in diameter. At the upper end the annual rings of growth, excepting in a small cavity at the heart, were counted by members of the State Geological Survey. The number of perfect concentric rings was found to be 1,255, and probably enough are obliterated in the cavity to bring this number up to 1,300. The tree is thus proclaimed to be 1,300 years old. In the first one hundred years the width of the annual rings measured but three inches. In the twelfth century of this tree's life this width was increased to thirteen inches, and during the last fifty-five years the total increase was nine and four-tenths inches.

There are in the grove four trees more than three hundred feet high, and ten higher than the tallest in the Mariposa Grove, which is two hundred and seventy-two feet in height. Eighteen trees are over forty feet in circumference.

The *Sequoia gigantea*, as well as its brother, the redwood (*Sequoia sempervirens*), is found in California only, although fossil wood, closely allied to it, has been found in Greenland. The former occurs in

comparatively small "groves" on the Sierra Nevada, while the latter extends along the west side of the Coast Range through nearly the entire length of the State.

The bark of the mammoth tree has deep longitudinal corrugations—and the interstices are filled with an elastic, spongy substance, from which pincushions of excellent quality may be made. The bark is reddish-brown, generally very thick, reaching in a few exceptional cases the thickness of twenty-four inches. The most common thickness on the large trees is about eighteen inches, although on some it is not more than three or four. The wood, which is red in color and closely resembles red-cedar, is straight-grained and soft, and very light when dry. It takes a fine polish. It may be easily split, and, like the red-wood, is exceedingly brittle.

The *Sequoia gigantea* bears two sets of leaves, those on the young trees being about five-eighths of an inch long and one-eighth of an inch wide. They are set in pairs on small stems opposite each other. The other set grows on the branches that have borne flowers, and are triangular in shape, about an eighth of an inch long, and they lie close to the stem. The cone, which is nearly smooth, is about the size of a hen's egg, although on one tree, "The Beauty of the Forest," I found them of about twice the ordinary size. The seed, of a light straw color, is exceedingly minute, some fifty thousand being required to weigh a pound. They are as thin as writing paper, about a quarter of an inch long and an eighth of an inch wide. Joined with the seed is a peculiar substance,

apparently a gum, which drops out when we shake a dry cone. About twenty cones are required to furnish an ounce of this material, which in the drying appears to have shrunk alike from seed and cone, and falls out in broken grains, with brilliant conchordal fractured surfaces. The color is purplish-black by reflected light, and a bright carmine-red by transmitted light. This gum tastes somewhat like tannin. It may be dissolved in water and ordinary alcohol, and gives the solution a brilliant claret color, which darkens on exposure to the air.

A long stay at this grove is by no means tiresome. There are many ways in which one may spend the time both pleasantly and profitably. Excellent hunting and fishing grounds abound at no great distance. Pleasant roads along the mountains disclose grand views of the surrounding peaks, and shady trails, leading to sylvan glades, invite the equestrian to the saddle.

Every time we stroll among these gigantic trees we see new beauties, whether in the early morning while the dew-drops still linger on the slender grasses and delicate flowers; or, at noonday, when we retreat from the heat into the still cool shades; or, again, when at night the deep recesses grow darker and yet more dark; or when, through the "dim-lit wood" the moonbeams fall, lighting up the depths where the forces of light and darkness are ever battling for supremacy. It is pleasant to-day to notice the bud of some strange plant, and to-morrow to wander to the same spot and examine the full-blown flower. When we tire of noticing the flowers

and butterflies, we may count the annual rings of growth on some of the fallen trees, and as the increasing numbers carry us gradually back into the remote past, it is pleasant to remember or fancy the consecutive events which have happened since these giant denizens of the forest sprouted from their minute seeds. Meanwhile the gentle breeze, swaying the top-most branches, whispers of a mighty future co-equal with the limitless past.

CHAPTER VII.

SOUTH GROVE.

"Here centuries have chronicled their years,
Yet left these grand old forms, still hale and strong,
And rich in waving boughs and emerald leaves."

ABOUT seven miles south of the locality described in the preceding chapter and a short distance beyond the boundary of Calaveras, in Tuolumne county, stands a group of over thirteen hundred *Sequoias.* This is called the South Grove, or sometimes the South Park Grove, and is by far the largest cluster of *Sequoia gigantea* that has as yet been discovered. Like those before described, these trees are also in a small valley, which has a greater length than that in which the Calaveras trees are found, although it is not so wide. The locality is at present reached by a trail, but a good wagon road to this grove is contemplated. Should this be built, it will do much to make this place better known, and would fully remunerate those incurring this expense.

Leaving the hotel, after an excellent breakfast to which we brought a good appetite from a previous stroll through the grove, we set out over the hills, carrying a good lunch with us. Just beyond the "Sentinels" we begin to ascend the hill that walls in the valley on one side. Reaching the summit, we

come to the road to Silver Mountain, where, at one time, very rich mines were thought to exist. From this point the view is grand; before us extend the pine-clad hills, separated by narrow valleys, beyond snowy peaks "in the wild pomp of mountain majesty" glisten in the early sunlight. To the right may be seen the San Joaquin Valley, and beyond that the azure-hued Coast Ranges.

From this point the descent is very abrupt, after which we travel for quite a distance beside a little streamlet. This part of the road is through a fine growth of beautiful trees, most of which are dog-woods. As we ride under this natural arbor, we feel in the cool air a desirable change from the heat we encountered while descending to this pleasant valley.

Here we notice where the shake-splitters have been at work. Shakes are split out of pine logs, and are about four feet long, six inches broad, and between half and a quarter of an inch in thickness. They are used for roofing houses, being attached to the roof in the same way as shingles, the place of which they supply. Frequently buildings are wholly covered with them, the shakes being used in place of clap-boards. Shake making is quite an industry throughout the Sierras, and, as there are many who have never seen the process, we will describe it. A fine large and symmetrical pine is found and felled. The trunk up to the point where the branches begin is cut with a cross-cut saw into sections about four feet long. These sections, which are of the length of the required shakes, are placed on end and the bark is chipped off with an axe. The process of

splitting now begins. The circumference of the upper base of this cylinder is then divided into arcs, about six or eight inches long, by splitting in the direction of the radii of the circle. This done, these sectors thus formed are cut off, so that the radii measure each about four inches, that being the width of the required shake. The pieces thus obtained are split to the desired thickness, the blade of the axe being applied in the line of the radii of the original circle. After what we might call one layer has been taken from the block, the same process is continued until the heart of the tree is neared, when work on that particular block ceases. Should a piece with a knot be found, it is thrown aside, as shakes must be perfectly straight and free from flaws. After splitting, the shakes are corded up with weights on the ends to prevent their warping. The heart, upper portion of the trunk and the branches are left on the ground to decay.

After riding through the low valley for a considerable distance, we ascend a small hill where beautiful wild flowers of many hues line the side of the trail. A little farther we see on the left that the tiny stream by the side of which we have been riding, falls over the rocks a distance of about fifty feet. The water strikes on one ledge and bounds merrily to another. The stream is not large, or the fall high, yet there is a peculiar beauty in the cascade. From the trail, its sparkling waters, seen through the openings in the trees, form a pleasing picture. But the other attractions in the vicinity are so much more engaging, and

the time allotted to the trip so short that, if this fall is seen at all, it excites but a careless remark, or receives but a casual glance.

We are descending the hill, at the foot of which flows the North Fork of the Stanislaus River, that partly forms the boundary between Calaveras and Tuolumne counties. The bed and sides of the river are granite.

"The channel worn
By ever-flowing streams—"

Is in some places as smooth as glass. The waters are very swift, and should a person fall into the ice-cold torrent, his chances of escape would be very few, indeed. The smooth, slippery sides would mock his efforts to grasp them, while the eddying waters would with frightful rapidity hurry him to destruction.

At this point the stream is crossed by a bridge about four feet wide. At each end log abutments are built to the water's edge. Extending from one to the other of these are two pine logs that form the timbers upon which the floor is laid. At first sight this structure looks very insecure. The pine logs having great elasticity cause the bridge to vibrate to a noticeable degree when one crosses. But the fibres of the logs being tough and the flooring securely fastened, the danger is not greater than on an ordinary bridge.

Above the bridge, a hundred feet or more, the river falls a few feet over a ledge of rock. The roar as we cross is deafening. At one end of this miniature Niagara a boulder juts into the torrent of eddying waters. On this it is pleasant to lie and watch the rushing stream. Near by, in a crevice in the

rock, grow beautiful red *pentstemons*, that are more noticeable by contrast with the gray granite. Many rich ferns and rare flowers grow high on the river banks and among the trees in the immediate vicinity, making this a spot where the botanist, or lover of Nature may spend many pleasant hours.

On the north side of the river, about half a mile below the bridge, rises a ridge of basaltic cliffs to the height of about one hundred feet. No similar rocks occur in the vicinity. They add a charm to the view wherever they form a part of the landscape.

From the river, for a considerable distance, the road is steep and rocky. Further on it winds along near the top of the ridge through noble groves, and descends abruptly to Beaver Creek. This is at some seasons a large, swift stream, and as there is no bridge over it, the stream then forms a barrier to horse-back travel to the South Grove. But it need never arrest the progress of pedestrians, as several large trees have fallen across the creek and make secure bridges. Along the stream where we cross is a dense growth of willows, and in some places a few cotton-woods appear.

After fording Beaver Creek we come to a new kind of vegetation—chaparral. This is a general name given to several shrubs that in growth are very similar, and cover extensive portions of California. Just above the ground the stalk divides into hundreds of wiry branches, that again separate into thousands of twigs. All these are exceedingly tough and elastic. Many of the bushes are armed with unpleasant looking thorns that make progress through the mass im-

possible. The bushes grow about three feet high—some higher than this, others shorter—and so thick are they that the branches generally are closely interlaced. The attempt, therefore, to force one's way through, proves utterly impracticable. Neither can one crawl over the ground, as the branches frequently lie flat on the earth. The only passage through chaparral is made by fire. The shrubs are very hardy, and after the tops are burnt off new sprouts will start from the roots in the following spring. Many square miles of California are covered with these shrubs, and have therefore never been explored. Among them large numbers of quails find a home, and to them the grizzly bear retreats before the advance of his enemy.

A few hundred yards from the creek the trail forks. Wishing to see as much as possible on our trip, we take the right hand branch, or the one lower down the hill. We leave the belt of chaparral and ride among grand pines. This is less traveled than the other trail, but we will find no difficulty in keeping our course, being guided by the "blazes," or axe-marks on the trees.

The growth of timber is remarkable. Did time permit we would gladly sketch this rock, that tree, or the graceful shrub by which we ride. What a landscape is here spread before us, and what a picture it would make!—the distant mountains veiled deeply in purple haze, and the nearer hills clothed with pines of various shades.

We enter the South Grove by this trail, near its lower end, and almost without knowing it find ourselves among the giants of the vegetable world. At

the right of the path stands a tree that lightning has riven from top to bottom, and two trees now stand there, the sundered halves of the original stock. All the branches are thrifty, as if a bolt had never fallen on the trunk through which they draw their life.

After riding a long distance, with mammoth trees on either hand, we arrive at a clearing near the centre of the tract. At one side, where the other trail from Beaver Creek enters the grove, lies a giant *Sequoia*. When this tree was blown over a large mass of soil and rocks adhered to the sundered roots. Enough earth to furnish sustenance to a tree of large dimensions still fills the cavities between the dead roots, that look more like individual trees than the channels through which the sap was drawn. Here we notice the same appearance that we have observed in the Mammoth Grove and elsewhere. Where this soil has been torn out by the falling of a tree, a large semicircular cavity exists. When the tree and roots decay, the earth held together by the latter will form a large mound. There are several of these pits, having a bank on one side, which much resemble redoubts.

We have abundant examples of the slowness with which the *Sequoia* decays. In this grove stands a kingly tree, ten feet in diameter and one hundred and fifty feet high, growing from the soil held among the roots of a fallen giant twenty-eight feet in diameter. The fallen tree is almost perfectly sound. By using as a standard the data obtained from the measurement of the felled tree in the Calaveras Grove, we are enabled to approximately determine the age

of this thrifty young Hercules, and to conjecture the length of time the trunk has lain there. When the original "Mammoth Tree" in the other group had attained a diameter of ten feet, the rings declare that it was about one thousand years old. Therefore, for ten centuries, with their various changes of climate, this great tree has lain prostrate, and the bark only has disappeared. Using the same data to determine the age of the prostrate tree, we find that when it bowed before the tempest it was not less than two thousand years old. More than three thousand years have therefore passed since the prostrate trunk began its career of growth. What better place than the trunk of one of these young trees could be found in which to deposit the records of to-day. They would remain there long after corner-stones had mouldered to powder, and the annals and learning of to-day had been handed to the

> "generations
> That, as yet unborn, are waiting
> In the great, mysterious darkness
> Of the speechless days that shall be."

Fire has held high carnival in this grove, as well as in all others. Still, the proportionate amount of injury done here, compared with the number of trees, is much less than in the Calaveras Grove, and very much less than in that of Mariposa.

One tree, estimated to be three hundred and twenty-five feet high, contains at its base several burnt cavities, one of which measures seventeen feet by twenty-seven, and is about thirty feet in height. Although the entire heart is destroyed and only the

outer portion of the trunk remains, pierced by burnt openings that communicate with the chambers, this tree has a hearty life, and may continue to breast the storms long after the majority of those now living lie sleeping in forgotten graves.

Another giant, "Cyclops," has been greatly damaged. The cavity in this tree is of sufficient size to contain eighteen horses.

Near the upper end of the grove there is another standing tree containing an immense cavity. This, like all the others, is thrifty, and unless the arched opening that leads to the interior is seen, one would pronounce this tree uninjured. The cavity, which is quite lofty, is twenty-seven by seventeen feet. An old hunter and trapper—Andrew Jackson Smith—made this tree his home for a long time, and from this fact it bears the name, "Smith's Cabin."

Like the tree that was his abode, Smith is a curiosity. Reared in the woods, he regards them as his own. He is familiar with the beasts and birds in the vicinity of his adopted home, and describes them eloquently in his plain, homely language. S. at one time cut bark in this grove for the proprietors, but at the time I met him he was splitting shakes on the San Antonio Creek, about a mile and a half from the Mammoth Grove Hotel. He came one day to the hotel, bringing the nest of the Water Ousel (*Hydrobata Mexicana*), a member of the Thrush family, and was referred to the writer as a probable customer. He told where he had found the nest, and complained of the wantonness with which fishermen destroy all they can reach with their poles. He described how

the mother builds her home of soft moss, under the ledges of rock where the constant dripping will keep it green, thus making the home cool and pleasant, and misleading the passer-by. Five little ousels were in the nest. When these would utter their plaintive "peep, peep," he would speak to them as tenderly and with as much solicitude as a mother to her rosy, dimpled infant.

One of the most remarkable objects in the grove is a prostrate trunk called "Noah's Ark." This is nearly four hundred feet long and about thirty-five feet in diameter. For over two hundred feet this trunk has been hollowed out by fire, and only a thin shell left uninjured. Through this, for about half that distance, three horsemen may ride abreast. The entrance is through an opening in the side, around which is a rank growth of beautiful wild flowers and feathery ferns.

Another fallen tree of note lies near "Smith's Cabin," and has been called the "Stable," from the fact that in the sides of the hollow extending about forty feet toward the top, pegs are driven, and there is sufficient room to fasten several horses. But, it is not the burnt cavity that makes this tree so interesting. The wood of the *Sequoia gigantea* being exceedingly brittle, almost all the fallen trees are more or less injured by the concussion. The "Stable" is not in the least broken. This would induce the belief that this tree fell at a different season, and under extraordinary circumstance. The time of the fall was probably deep winter, and a heavy coat of snow, doubtless, lay on the ground, upon which it struck.

The shock of the fall was, therefore, not severe, and the tree gradually sank through the yielding snow, until it lay uninjured at full length on the ground. A fact in favor of this theory is that the trunk is not imbedded in the soil as is a fallen tree in almost every case, and frequently to the depth of several feet.

In this grove the proprietors cut the bark that is sold at the Mammoth Grove Hotel. That here obtained is thick and of good quality—and equal, if not superior, to any found elsewhere in the groves, with the exception of that of a single tree, "Andrew Jackson," in the Mariposa Grove. The bark from that tree is much finer in texture than any I have seen from other districts. When the bark is sawed, it presents the appearance of fine velvet.

This grove differs from the one we have first described in many particulars. While in the Calaveras group there are ninety-three trees, thirteen hundred and eighty have been counted here. Fewer trees have been injured by fire and, with the exception of the instances mentioned, they have suffered but slightly. The fallen trees in the South Grove are surprisingly few in number, compared with those in the Calaveras. The number of baby trees is much greater here, and in some places they are exceedingly numerous. At one place, where half the shell of a burnt out trunk lies on the ground, hundreds of these trees, from two to three inches to as many feet in height, line the side of the wreck and grow in a line through the center where the trunk has split apart, and left the ground exposed.

One other distinguishing feature of this grove is its varied vegetation. Under all the trees the ground is completely covered with a dense growth of flowers, vines, and ferns, which ordinarily grow to the height of about a foot. By the sides of the fallen trunks, and where the ground contains the most moisture, the verdure, in its luxuriance, presents a tropical appearance.

Before me, as I write, is a little picture. In the middle of the grove is a glassy pool, over which droop beautiful flowers, slender grasses, with large, full heads, and feathery ferns that lie on the surface of the water. Behind the pool a sparkling little rill springs over a mossy bank, and pours liquid diamonds into the quiet waters below. In the distance are long tree vistas, while over the pool slowly float great black butterflies, and a merry bird, after sipping the cool draught, carols forth his satisfaction, as he sits with half unfolded wings on a swaying spear of grass.

CHAPTER VIII.

MAMMOTH CAVE OF CALAVERAS.

CAVE City is seven miles north of Murphy's, and fourteen miles west of the Mammoth Trees. At this town one of the detached masses of limestone before mentioned is found, and from the discovery of an extensive cave in this rock a few dilapidated houses located here derive a name.

Although this locality is not as generally visited as many other places, it is quite curious and interesting. There are no means of reaching it but by private conveyance, and probably this fact more than any other has been the cause of its long obscurity. A wagon road lies between this place and the Calaveras Grove, while it may also be reached by trail from Murphy's. At either of these latter places horses for the trip can be procured.

Having determined to see this wonder, and as no one could be induced to accompany him, on a bright, clear morning, in early June, the writer set out alone on horseback to visit Cave City, and thence to proceed to Murphy's.

Having followed the main road to Murphy's for about a mile, I reached one (Dunbar's Road) which branches off to the right, and winding through a picturesque country finally unites with the old road at the half-way house.

This road was followed for some distance and then abandoned for one which turned into a little valley on the right, through which flows the San Antonio. This valley is divided from the one in which the Mammoth Grove is situated by the thickly wooded ridge that lies at the back of the hotel. In this depression Dunbar's Mill formerly stood. Now nothing remains as a landmark except a few burnt timbers, some scattered buildings, a great amount of refuse lumber, and part of a long flume.

From the "mill" I ascended the ridge to the west of the San Antonio, and for several miles traveled along the summit. A fine growth of young pines perfumed the pleasant morning air. Nothing disturbed the stillness but the occasional bleat of a sheep feeding in the valley below, or

> "A song of birds and a sound of bees
> Above in the boughs of the sugar-pine."

So much that was beautiful was not to be passed, so my horse, unguided, unurged pursued his own pace.

As I reached an opening on the ridge an excellent view presented itself. The day was hazy. Features of the landscape that had been seen in clear daylight or bright moonlight, were now half mantled in shadow. The high snow-clad peaks, pine-covered hills and quiet dales, the broad, brown valley, and the distant mountains that hold the westward ocean at bay, were all blended in one grand, glorious, harmonious picture that, once seen, can never be forgotten during life. It was one of those views that forbid description.

After traversing the mountain ridge for several miles, I descended into a small green valley, and followed the bed of a dry creek for some distance. Arriving at a roughly-constructed house, which bears the name Swiss Ranch, I found that I had added unnecessarily several miles to my journey by the route I had taken. At Dunbar's Mill I should have turned to a ridge farther toward the left than the one I followed.

The only men I saw before reaching Swiss Ranch were herders, who were tending many thousands of sheep scattered throughout these hills, where the grazing was good. They were waiting for the snow to melt and the grass to start on their "ranges" or pasture-lands high up among the mountains.

California is becoming an important wool-producing State. In the central section of the State the sheep are mostly raised in the northern portion of the San Joaquin and the southern part of the Sacramento Valleys. In most of this region by June the ground is dry and baked, and the grass dead. No new supply is to come till the fall rains moisten the ground, in the crevices of which the wind has sown the seed, thus protected from countless swarms of little birds. To obtain fresh feed the herders drive their flocks up into the valleys of the Sierra Nevada, where the grass is ever green and plentiful. The shepherds have free use of this grass, as most of it grows on unsurveyed government land.

As the season advances the sheep are driven out of the mountains to escape the inclemency of the winter. The loss to the flocks by these migrations is

sometimes very great, being caused by over-driving and carelessness of the herders. These men, being frequently hired by the month, often care little for the interests of their employers. In order to protect themselves against these losses, some sheep owners build *corrals* and sheds in the mountain valleys, and there keep the sheep through the winter on hay cut in the vicinity. Ordinarily money is saved by this method.

One winter, however, a few years ago, was very severe. The owner of large flocks had gathered his sheep into ample sheds, stored with what was considered a very abundant supply of hay. The rigor and long continuance of the winter exhausted the feed supply, and nearly all the flock perished.

From Swiss Ranch (so named in honor of a few Swiss who reside there) a rough and poorly-marked trail leads over the mountains about three miles to Cave City. It was near noon, and many miles yet lay between me and Murphy's. It seemed, therefore, inexpedient to try this trail and run the risk of being obliged to abandon the way through the chaparral, and to return to the main road. Therefore, I followed the road to El Dorado, distant about six miles, and then traveled back to Cave City, three miles farther.

It is half-past two when I reach El Dorado. I enter the only saloon in the place. A large room contains a very dilapidated billiard-table. A poor apology for a counter stands in one corner. Behind this a dozen bottles, partly filled with cheap liquor, are ranged along a shelf. The paper on the walls is extremely

fragmentary and dirty. At a round table on one side of the room sit two roughly-dressed, ill-looking men. A pack of greasy cards, with worn corners and edges, lies on the table. An old man enters, with gray beard and halting step. The Rip Van Winkle of the Sierras, awakened from the sleep of many years, seems to stand before me. How well does Irving's description apply to him: "Having nothing to do at home, and being arrived at that happy age when a man can be idle with impunity, he took his place once more on the bench at the inn door, and was reverenced as one of the patriarchs of the village, and a chronicler of the old times." The two men, who had in turn been silently fingering the dilapidated cards, requested Uncle Bill—for such his name proved to be—to join them in play. His clear eyes understood the speech which the deafened ears refused to admit, and he joined them in a silent game of "seven-up." After a few moments, I withdrew, leaving them to the reflections which the magic of the cards and the surroundings might recall respecting the busy days when the large bar-room was filled with a jolly, noisy throng that adverse fortune had scattered.

Along the way from El Dorado to Cave City were many mining ditches through which the thick yellow water ran slowly. On the left were numerous hydraulic mines, in some of which men were working.

The town is at the bottom of a valley through which extends a broad belt of limestone. Great boulders are piled here in fantastic forms. One rock on the top of a limestone mass resembles, in a remarkable degree, a carved lion of some old Oriental city.

Cave City contains scarcely more than a dozen buildings, and several of these are vacant. The appellation "city" is, therefore, a misnomer. There did not appear to be more than fifteen people in the place, Chinamen included, and not more than one-third of these were at work. With all its drawbacks the town has still some advantages which more flourishing ones do not possess. The first man I met was the one whom I was seeking (Mr. Geo. E. Nicholas, proprietor of the cave), and as he was doing nothing he had plenty of time to give to me.

Reaching the entrance of the cave, Mr. N. pointed out a spot where a hotel formerly stood, which has been entirely destroyed by fire. His house now serves in place of a hotel, and, unless the travel greatly increases, will prove a sufficiently extensive caravansarie for years to come.

Unlocking the door built over one of the apertures and lighting our candles we begin our exploration. The first twenty or thirty feet are rather difficult to travel. The passage is not unlike a natural staircase, being a crevice that has been enlarged by blasting. Here, as throughout the entire cave, we are at times forced to stoop low, in order to avoid large masses of projecting rock. At the foot of the steep narrow passage we rest a moment that our eyes may become familiar with the darkness. Here our guide gave an account of the discovery and exploration of this place.

The cave was discovered by accident in the fall of 1850. After dinner, some miners were shooting at a target near by. One of the party proposed a longer

range, and was seeking a tree on which to place a mark, when he came to an opening in the rock. An exploration was made, and the cave was soon opened to the public.

Since its discovery, although many persons have visited it, tourists have not generally made this cave a place of resort, as it is off the main course of travel. The amount of money obtained from visitors has not warranted a great outlay, and much remains to be done in blasting new passages to chambers yet unexplored, and in improving the means of communication between those already opened.

Probably as interesting a room as any is the "Odd Fellows' Hall." Here is a slab about ten feet square, uneven on the upper face, but perfectly smooth and level on the under surface. This slab is not more than ten inches thick at the edge and extends directly from the wall at a point about two feet above the floor of the room. When struck, it gives out a dull ringing sound, while it is so firm and solid that it will support a great weight. "The goat," so called, is found at the back of this slab, in a passage that leads to a chamber not yet fully explored, but of great beauty. This "goat" is a mass of rock which strikingly resembles that animal in size and shape.

In one chamber a calcareous formation presents the appearance of a water-fall, and has been called the "Cataract." From a point apparently far beyond that to which the dim light of our candles can pierce there seems to proceed a foaming mass of water, dashing silently down from ledge to ledge. So nearly does this mass of limestone resemble a

cascade with its foam and sparkling drops that it is with difficulty we are convinced that the illusion is not a reality.

One room has received the name, "The Cathedral," so accurate is the likeness to one of those grand buildings through whose long drawn aisles for centuries have floated hymns and dirges. Gothic windows are around us, and the vaulted roof rises high into the mantling darkness.

Caves generally have a "Bridal Chamber," and this is not without one. In this room the cold, gray walls are covered with a delicate tracery of stalactites, while around the ceiling, and here and there along the sides, heavy, snowy draperies, conceal or relieve the sharp outlines elsewhere found.

While the "Bridal Chamber" is beautiful, apartments are found here which are dreary and repulsive. There are rooms whose naked walls remind one painfully of—

> "Chillon's dungeons deep and old,
>
> * * * * * * *
>
> Dim with a dull imprisoned ray,
> A sunbeam which hath lost its way,
> And through the crevice and the cleft
> Of the thick wall is fallen and left;
> Creeping o'er the floor so damp,
> Like a marsh's meteor lamp."

Perhaps the most curious chamber is the "Music Hall." On one side stands a peculiarly-shaped rock that answers the purpose of a sounding board. From this hangs a row of stalactites. At one end of the room they are small, but gradually increase in size

and length as they near the opposite extremity. These differ from ordinary stalactites in that they are flat, from a quarter to half an inch in thickness, and appear to be folded together in such a manner as to resemble box-plaiting. When these pendants are properly struck with the fingers, or with a stick or a stone, a clear musical sound is produced. Each stalactite gives out a different tone, so that a musician can play almost any tune on these natural keys.

One chamber contains a lake of fair proportions, while in another a well, said to be over a hundred feet deep, has been discovered. The water, which is quite pleasant to the taste, is coated over with a thin scum that causes it to resemble in color the floor of the cave. Had not timely warning been given by the guide as we neared the well, the consequences might have been unpleasant.

Almost every apartment is entirely different from the others. Some of the rooms have walls of bare bluish-gray limestone, while others are resplendent with countless stalactites and stagamites of various forms. The ceilings of some of the rooms are perfectly smooth, and look as if they had been smoothed with a trowel when in a plastic state. In some of the chambers we find cracks that extend to the surface of the earth, and admit a dim, unnatural light. Through some of these clefts seeds have fallen into the cave and are striving to grow against most adverse circumstances. On an old ladder near one of these openings, beautiful white *fungi* were growing, so delicate that a breath was sufficient to destroy some of them.

The floors of the cave are mostly of the native earth, a yellowish clay, while many of the walls are of the same material, either partially or wholly coated with lime formations.

It would seem that in some mighty convulsion, these masses of limestone were greatly rent. Through the fissures thus formed water has coursed for a long time, wearing out the chambers and passages, sculpturing the walls, and leaving the deposit of clay that forms the floors. Since then, from moment to moment, the dripping process has continued, each little drop contributing to build up fantastic forms, or to restore those that vandal visitors have partially destroyed.

I left Cave City as the sun was nearing the horizon, and a ride of two hours brought me to Murphy's. The trail passes through a pleasing country. The hills are very steep, and are furrowed along their sides by a net-work of ditches. In the valleys fertile spots surround scattered houses, while here and there winding roads lead to towns nestling among the rolling hills.

CHAPTER IX.

GOLD MINES.

"Gold is the strength, the sinews of the world;
The health, the soul, the beauty most divine;
A mask of gold hides all deformities."

BEFORE beginning that part of our journey which leads through the extensive mining district lying all around us, and stretching far away along our route to the Yosemite, it will not be out of place to take a comprehensive view of this section.

In regard to the extent of the gold field in California and the geology of this region, I will quote from the report of the Commissioner of the State at the Paris Exposition of 1867:

"The principal gold region of California is upon the western slope of the mountain chain of the Sierra Nevada, and is nearly co-incident with it in extent. Commencing at the south in Tulare and Kern counties, nearly under the parallel of 35°, it extends northwards through the whole range of counties of the State to the Oregon line—the parallel of 42°—thus extending over seven degrees of latitude, or about 500 miles.

"The great bulk of the gold is, however, obtained from the central counties: Mariposa, Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra,

Yuba, Butte, and Plumas, lying between the parallels of 37° and 40°. This is the region of the most extensive and productive placers. Gold is also found upon the coast in Del Norte County, and at several places in the Coast mountains southward.

"At San Francisquito, in Santa Barbara county, south of the main gold field, placer gold was discovered as early as 1838, and gold was known to exist along the Colorado river as early as 1775. Gold is not confined to the western water-shed of the Sierra, for it is found at many places on the eastern side as well as near the summit." * * * *

"The principal rocks of the gold belt on the west slope are clay-slates, sandstones, and conglomerates of the Secondary period, uplifted at high angles and dipping east. They are generally much altered—metamorphosed—and are associated with serpentine; also a metamorphic rock. Gold-bearing veins occur in or are closely associated with all these rocks, and in hard and compact granite, in greenstone and dioritic rocks, and in dolomite and metamorphic limestones. They are found even in the partially metamorphosed stratified formations of the Cretaceous period in the Coast mountains, and they may also be found in the Tertiary strata."

* * * * * * * * *

"The gold-bearing veins of California are largest and most extensive in the region of the metamorphosed Secondary rocks. They generally conform to the dip and strike of the strata, and vary in width from a few inches to 20 or 30 feet. When they traverse granite or metamorphic rocks, in which the

stratification is nearly or quite obliterated, they are generally narrower and more uniform in width than when in the softer rocks or slates. The most extensive vein of the State, and perhaps in the world, is known among the miners as the 'Mother vein,' and extends, but with some considerable breaks and interruptions, from Mariposa northwestward for 80 or 100 miles, following a zone or belt of Jurassic slates and sandstones, and closely associated with a stratum of dolomite or magnesian rock, often a magnesite, filled with reticulations of quartz veins, and charged with pyrites. The outcrops of this rock are generally very rusty and porous in consequence of the decomposition of the pyrites, and show green films of an earthy mineral containing chromium.

"Nearly all of the auriferous veins of California are composed of white, or bluish-white quartz, with, in general, not over two per cent. of sulphurets. These sulphurets are chiefly ordinary iron pyrites, with, occasionally, a little galena and blend. In some veins iron pyrites is replaced by arsenical pyrites or mispickel." * * * * * * *

"The average fineness of California gold was formerly about .885. For a few years past it has not averaged so high, ranging from .865 to .870, and containing about one per cent. of the base metals; its composition being, nearly, .87 gold, .12 silver, and .01 base metals. This decrease of fineness is due, undoubtedly, to the increased quantity of gold from veins, and, perhaps, to the mingling of gold from Idaho, which contains a large amount of silver."

The auriferous belt in California is so extensive, that, in common description, it has been divided into two districts, denominated, respectively, the Northern and Southern Mines, although the exact location of the dividing line is uncertain. This latter section is thus described by R. W. Raymond, U. S. Commissioner of Mining Statistics:*

"The term 'southern mines' is an indefinite one, but is generally understood to embrace the country between the Cosumnes River on the north and the Chowchilla River on the south, a distance of one hundred miles, and to include the counties of Mariposa, Tuolumne, Calaveras and Amador. In width the mineral belt extends from the eastern edge of the San Joaquin Valley to an average altitude of 2,500 on the Sierras, a distance of forty miles east and west, thus embracing an area of 4,000 square miles.

"This region of country was the scene of the earliest mining operations in California, as the surface placers were here more accessible and productive than further north; and within its limits are found the once populous and thriving mining towns of Mokelumne Hill, Columbia, Sonora, and Mariposa. Its population, as estimated in 1851, by Abbé Alric, then parish priest of Sonora, was not less than 50,000, nearly all of whom were engaged in mining.

"This extensive territory is cut and eroded to great depths by four principal streams, running from east to west, and crossing the course of the ancient streams, viz: the Merced, Tuolumne, Stanislaus, and

* Silver and Gold, Rossiter W. Raymond, Ph. D. N. Y., 1873, p. 46.

Mokelumne Rivers, which, with their tributaries, have acted as distributors of the auriferous deposits, and carried the gold from its original place of deposit to the banks and bars which yielded such enormous sums during the early days of mining. The waters of these rivers have since been diverted into ditches and flumes for mining purposes, and their principal tributaries run dry in the summer, giving the country a parched and desolate appearance during the greater part of the year.

"Within the area above described, scarcely a square mile can be found in which, even at this late day, a 'prospect' cannot be obtained, although placer mining, as a business, has ceased to yield large returns, except in the opening of new ground at points where water has been lately brought in, or in the development of the ancient channels. Superficial placer, as well as river and bar-mining, may be considered as practically exhausted, although operations are still prosecuted, on a small scale, on the limestone belt, and on the rivers during the short season of abundant water.

"The principal mineral resources of the southern mines, at the present time, are vein-mining in the gold-bearing quartz belts, and gravel-mining on the ancient channels."

At present placer mining has indeed well-nigh cased. Through the auriferous belt Chinamen, with their rockers, pick up scanty gleanings after the golden harvest that the white miner long ago gathered. The white-veined rock now reluctantly gives up its golden flakes under the pulverizing energy of

the mill. What a transition from the comparatively easy labor of the pick, shovel, and pan, to the complicated engineering and exact mechanism of the twenty, forty, or sixty-stamp quartz-mill!

Extending through the Southern Mining District is one of the most wonderful quartz-veins in the world. This is called the "Mother lode." R. W. Raymond writes:* "The Mother lode of California is a vein, or, more properly, a series of veins of quartz which has been traced on a longitudinal line, with occasional interruptions, for a length of about seventy-five miles, from Bear Valley, Mariposa County, to Amador City, Amador County. Throughout the entire distance it has a general north-west and south-east course, and an almost uniform dip to the north-east of eighty degrees."

"The most southerly well-defined out-crop of this remarkable vein is at the Pine Tree and Josephine mines, on the Mariposa estate, at an elevation of about 2,500 feet above sea-level. From this point it takes a north-west direction, striking across the numerous spurs of the Sierras which form the divides between the Tuolumne, Stanislaus, and Mokelumne Rivers, and their tributaries, and terminates in the foot-hills of Amador County, the most northerly deep-developed claims being the original Amador and Keystone, at Amador City, although many locations between these mines and the Cosumnes River are supposed to be on the same lode. Beyond the Cosumnes the lode is not traceable.

* Silver and Gold. R. W. Raymond. pp. 48-49.

"Between its southern and northern extremities it is frequently broken up and lost (invariably so at the intersection of the principal rivers), making its appearance again at a distance of several miles, frequently in the form of a solid wall of quartz on the summits of isolated hills on the line of its strike, these croppings being visible for many miles. The most prominent of these hills are Piñon Blanco, Quartz Mountain, Whisky Hill, and Carson Hill."

* * * * * * * * *

"The longest break of the lode is between Angel's and Jackson, a distance of twenty-three miles, on which only one mine, the Paloma, near the south bank of the Mokelumne River, is generally acknowledged to be on the lode, though recent discoveries tend to prove the continuity of the lode between these points. At various other points the lode 'dives' for several miles, and at one point, between Whisky Hill and the Rawhide mine, it is covered by the lava flow which constitutes Table Mountain."

J. Ross Browne writes:* "The Mother lode is in many respects the most remarkable metalliferous vein in the world. Others have produced and are producing more, but no other has been traced so far, has so many peculiar features, has exercised so much influence on the topography of the country about it, or has been worked with a profit in so many places. The great argentiferous lodes of Mexico and South America, the most productive of precious metal of all known in history, can be followed not more than six

*Resources of the Pacific Slope. J. Ross Browne. S. F., 1869. pp. 14, 15.

or eight miles; while this California vein is distinctly traceable on the surface * * * more than sixty miles." * * * "The chief peculiarities of the Mother lode are its great length, its great thickness, its uniform character, the near proximity of large companion veins, of which at least one is usually talcose, and the richness of the talcose veins."

There are in this section other quartz mines than those on the Mother lode. An extensive series of veins exist on the Sierra at an altitude of about 4,000 feet. Raymond writes:* "The veins here present many striking features of interest. Like many of the most noted veins in California, they occur in fissures which have been opened in the earth's crust by the rending asunder of the rock formation across its stratification. The country rock is slate. This contains numerous dikes of traps, porphyritic greenstone, etc., occupying fissures which run transversely across the slate. There are several parallel fissures, nearly vertical, having a course of N. 40° E., with very solid and smooth walls, and from five to twelve feet wide. In these occur the quartz veins, the quartz occupying only a portion of the space (three to nine feet), the balance being filled by an accompanying vein matter differing from the country rock, and not found outside of the fissure walls. The whole of this vein matter is full of base metals, particularly the sulphurets of iron, deposited in a way that indicates a previous state of solution, or possibly vapor; for besides being disseminated throughout the body of the rock, the faces of broken pieces,

* Silver and Gold. R. W. Raymond. pp. 50-51.

which had no seams visible to the eye, are often found coated with particles of metal, forming flakes which can be removed with a knife-blade. All of this material contains some gold, but the pay-rock proper occurs in chutes of a peculiar kind of quartz, which is held by many of the miners to belong to the true chimneys of the precious metals. It is so thoroughly impregnated with the various base metals, especially the sulphurets of iron, lead, and zinc, that not an ounce of it can be found destitute of these. The gold is diffused in fine particles through the ore, as if an element of its composition. The ore in these lodes is of high grade."

Extending through the entire Californian gold region, at various depths beneath the present surface, the beds of an extensive system of water-courses, called by some "Dead Rivers," have been traced. The beds of these former streams furnish some of the richest placer diggings in the State. To fully understand the geological formation of these interesting localities, it will be necessary to imagine, by the help of geology, an ancient landscape, and to trace the various changes that have occurred to the time that the scenery of the present day spreads itself before us.

Writing of this former time, John Muir uses the following words:* "In the beginning of the long glacial winter, the lofty Sierra seems to have consisted of one vast undulated wave, in which a thousand separate mountains, with their domes and spires, their innumerable cañons and lake basins, lay

* Overland Monthly, Vol. XII, pp. 393, 394.

concealed. In the development of these, the Master Builder chose for a tool, not the earthquake, nor lightning to rend and split asunder, nor the stormy torrent, nor eroding rain, but the tender snow-flowers, noiselessly falling through unnumbered seasons, the offspring of the sun and sea. * * * *

"When the great cycle of icy years was nearly accomplished, the glacial mantle began to shrink along the bottom; domes and crests rose like islets above its white surface; long, dividing ridges, began to appear, and distinct glacier rivers flowed between. These gradually became feeble and torpid. Frost-enduring carices and hardy pines pushed upward along every moraine and sun-warmed slope, closing steadily upon the retreating glaciers, which, like shreds of summer clouds, at length disappeared from the young and sunny landscape."

The frigid winter was terminated. The ice sheet had completed its mission of grinding, crushing, and breaking. Ice streams had continued the work of mountain sculpture. Their task was finished. Rivers of water were completing the allotted labor. At this time hundreds of peaks in the Sierra Nevada burst into active volcanoes, and ruddy streams of lava ploughed their courses through the still lingering snows on the mountain sides. Converging, and following the beds of the former rivers of ice, these streams of molten matter lapped up the water flowing there, and filled the atmosphere with clouds of steam. Over immense tracts animal and vegetable life was completely destroyed. Gradually the lava cooled. A more terrible scene of devastation, a more

impressive desolation, it would be difficult to conceive.*

The steam which had been generated by the heated lava in contact with the water of lakes and rivers, gradually collecting, formed large clouds, which, becoming at last overcharged, copious rains were poured down on the cooling mass. For a time the water was vaporized almost as soon as it touched the heated rock. At length, as the lava-flow decreased in temperature, ever-enlarging pools accumulated in the depressions. The cooled lava was harder than the dividing ridges which formerly lay between the streams whose courses it had filled, so that in seeking its way to the ocean the water wore for itself courses through the less solid matter.†

Thus it happens that the streams of the present day do not pursue the courses which the ancient rivers followed. Here, also, we discover the origin of the lone basaltic mountains, which have received the designation, Table Mountains. They are the

*A larger lava-flow of the same character took place further north, and is thus described by Joseph Le Conte, Professor of Geology in the University of California.—Proceedings of the California Academy of Sciences, Vol. V, p. 215. "Issuing from fissures in the Cascade and Blue Mountain ranges, it spread over nearly the whole of Oregon, Washington, and Idaho, and far into California on the south, Montana on the east, and British Columbia on the north. Its area is certainly 200,000 to 300,000 square miles. Its thickness in the axis of the Cascade Mountains, where it is cut through by the Columbia River, is more than 3,500 feet. The section shown by the Des Chutes River, fifty miles from the axis, is 2,000 to 3,000 feet. The average thickness over the whole Cascade region (100,000 square miles) is probably not less than 2,000 feet."

†Professor Whitney estimates the amount of denudation which has taken place in this section since the great lava-flow at not less than 3,000 or 4,000 feet of vertical height.

streams of lava which flowed between hills that have since been worn away. On our ride to the Yosemite we will travel many miles with one of these lava ridges in view.

Among the sand and gravel of these ancient, or "Dead" rivers, great amounts of gold have been obtained. At Table Mountain, and in that vicinity, tunnels are pushed under the lava, and the auriferous gravel is mined out.

These extinct rivers ran generally parallel to the direction of the mountain range, and in some places at almost right angles to many of the present streams. Their course may be traced by the stumps of trees imbedded in the sand, while their size and velocity can be estimated by the broad belts of water-rounded cobble-stones and pebbles which mark their track.

John S. Hittell, speaking of one of these rivers, says:* "The greatest dead river of California, in length, breadth, depth, and wealth, is 'The Dead Blue River,' as I call it. Some gentlemen, connected with the State Geological Survey, have denied the correctness of my assertion, that there is such a stream; and they claim that the gravel deposits which I include in it, were not made in a river-bed; but I adhere to my opinion. A line of placer mining towns extends from Forest Hill, on the southern line of Placer County, to the northern line of Sierra County, a distance of sixty-five miles in a north-north-west direction, intersected by the live streams, some of which run in cañons 2,000 feet deep. These towns are situated at the points where the auriferous de-

* Resources of California. J. S. Hittell. 6th edition. pp. 338, 339.

posits of the Dead Blue River are accessible. The gravel is uniform in its character, and rich wherever the lower strata have been reached. The name was suggested by the general bluish color of the sand mixed with the pebbles and boulders, most of which are of quartz. The term 'gravel' is applied to the material found in these dead rivers, though in it we often find boulders a foot, or three feet, or six feet through. The lower the strata, as a general rule, the larger, rougher, or less regular the pieces of stone.

"The abundance of quartz in the Dead River is astonishing and inexplicable. In the large live streams running through the quartz districts we find, perhaps one per cent. or one-fifth of one per cent. of the gravel and boulders composed of quartz, and we know that in the rock eroded by the live streams running down the Sierra Nevada, quartz does not form one-twentieth of one per cent. But in the Dead Blue River, we find that fifty or seventy per cent. of the gravel is quartz. And its absolute quantity is not less wonderful than the proportion. The Dead Blue River contains a hundred fold more quartz in its pebbles and boulders than we could get from all the known quartz veins in the Sierra Nevada, if we should dig them out through their entire length to the depth of a mile.

"This Pliocene river was a quarter of a mile wide on an average, was parallel with the Sacramento, but fifty miles farther east, and carried ten or twenty times as much water. The current ran southwards, as that of the Sacramento does. We know this fact from the present elevations, from the manner in

which the flat boulders lie pointing down stream, from the direction in which the branches—which, like the main stream, are filled with gravel—enter it, from water-worn pieces of driftwood, and from drift trees with the tops pointing down stream. We find such marks in live streams, and they cannot be attributed in the Dead Blue, as it is sometimes called, to any influence save that of a strong current flowing southward.

"It was a stream of wonderful force, far exceeding in power any of its size now known. The miners find strata of boulders, many of which weigh a ton, deposited over a width of a quarter of a mile, and a length of sixty miles; above that is another stratum of boulders, in which half-a-ton is a common weight, and so on, until ten feet above the bed-rock we find boulders a foot through. We do not know, nor are we justified in supposing, that the Columbia or Mississippi could distribute such boulders with such regularity. The entire depth of the gravel is from 200 to 400 feet, averaging 300.

"The bed of the Dead Blue, at Forest Hill, is 2,700 feet, and at Little Grizzly, the most northern point to which it has been distinctly traced, 4,700 feet high—a descent of 2,000 feet in 65 miles, or 37 feet in a mile. A fall of five feet in a mile makes a swift river; with one foot in a mile, a canal eats away its banks. The country in which the Dead Blue runs has been raised by subterranean forces, or contractions of the earth's crust, and the upper end may have been elevated more than the lower; though the

Sierra Nevada down to 36° has been raised more than that to the northward.

"North of Sierra County, the Dead Blue River is covered with lava, or otherwise hidden, while south of Placer, it has been washed away or covered with later alluvium."

In regard to this interesting subject, Prof. George Davidson, writes:*

"So far as I have examined them, I see in these great gravel deposits the result of one mode of production.

"The 'hydraulic' method of working is being pursued systematically and with increased intelligence, so that in a few years we shall be able to trace the bedrock over areas sufficient to determine what was the power of disintegration and of subsequent movement.

"My examinations were made incidentally in the course of more urgent duties, and were limited; but, so far as they went, I became satisfied that the chief power in disintegrating the materials and moving them was that of glaciers, aided in small amount by the water from the ice.

"At Smartsville, there is a hill of auriferous gravel over 400 feet in height, lying between the hills of rock that have not 'the color' of gold about them; these rocks are not of a character to retain for ages the marks of ice-action, and are, moreover, rarely exposed. The gravel about Smartsville is cemented together so compactly as to require the use of gunpowder to shake and shatter great masses sufficiently to be acted upon by hydraulic piping with a head of

*Proceedings California Academy of Sciences. Vol. V., p. 146.

two hundred and fifty feet. Through the cemented mass are found fossilized oak trees of two and three feet diameter, and a close-grained tree completely blackened, and reaching fifteen feet in diameter.

* * * * * * * * *

"So far as I could judge from its position and configuration, this hill formed a great glacial terminal moraine. I could not see how the action of water could produce it, or leave it where it was: the gravel, boulders, and cement do not bear the appearance of being formed by moving waters; and the gold particles, instead of being rounded, are flattened. Nor could I see how volcanic action could account for it; tufaceous lava may be part of the cementing material, but I could not appreciate it. Higher up this ancient bed, there are said to be no gravel deposits for fourteen miles; when they commence they are continuous for miles; but I had neither time nor opportunity to examine their relation to the adjacent hills.

"At Cherokee Flat, Dr. Waldehr, Superintendent of one of the gravel mines, assured me that in running a tunnel for their work upon the bed-rock, he has detected well-marked glacial markings."

I cannot better close this chapter than by quoting the following passages, in regard to the "origin of gold nuggets and gold dust," from an article written by Mr. Andrew Murray, F. L. S., published in the London Scientific Opinion, in 1870, and inserted by Commissioner Raymond in his volume, "Mines, Mills and Furnaces:"*

*Pp. 508–509.

"The origin of gold nuggets and gold dust is not so simple or clear as at first sight it appears to be. The natural explanation of the production of gold dust is, that it is the golden portion of the *débris* of rocks, which have originally had gold disseminated through them. As the wear and tear of ages have crumbled into dust mountains so composed, part of the dust becomes sand, or quartz, or whatever else the basis of the rock may be, and the other part is the liberated gold, from which the quartz has been rubbed away; and if we accept this as the explanation of the production of gold dust, the same hypothesis should explain that of gold nuggets, which are found associated with it. But there are various circumstances which it is difficult to reconcile with this theory. One of these is the occurrence in the drift of nuggets of a larger size and less intermixed with foreign substances than have yet been discovered in any quartz reef; as most people are aware, the gold in reefs is usually disseminated in particles and strings through the quartz-veins or rock, instead of lying in pockets or masses. Another still more remarkable fact, applicable both to gold dust and gold nuggets, is that alluvial gold is generally of a higher standard than that obtained from the reefs. It is needless to say that if it is merely the gold washed or crumbled out of these reefs, it ought to be of identically the same standard and quality. Another objection to the dust being merely the degraded particles released from the rock, is the size of the particles—not nuggets, but particles of dust. Gold being so much softer than quartz, its particles, after

being subjected to the same degree of attrition, ought to be vastly smaller. Although of greater toughness than quartz, and possessed of ductility and tenacity, which quartz wholly wants, it is very soft, and, under the influence of the attrition from running water and its accompaniments, ought to be pounded and torn into the minutest fragments; but this is not so. There is, moreover, a marked difference in the appearance of the gold dust from different drifts in different countries. In some it is like dust or sand, in others it is like scales. If subjected to the same influences in all, there seems no reason why the same shape should not obtain in all cases.

"These peculiarities would suggest that some other influence than mere degradation of gold-charged rocks has been the agent in producing gold dust; but in any and every view, we think it cannot be disputed that degradation must have had some share in the work. It is plain that if a gold-charged rock is reduced to gravel, sand, or powder, particles of gold, of some size or other, or gold in some shape or other, must form part of the *débris*. These gold remnants should be found in greater quantity, and in greate. size, the nearer they lie to the source from which they were drawn, and this we believe also to be the case. * * * We imagine that the truth will be found to be that the result is referable to two causes, only one of which may in some cases have been present, in others, both. The first, the ordinary process of degradation and grinding the rocks to fragments; the other, as suggested by Mr. Selwyn, the government geologist of Victoria, that gold has

also been taken up in solution by the water permeating the gold-bearing rocks, and that in passing through the drift, in which minute particles of gold lay, it has, from some cause, become decomposed, and the gold held in solution been precipitated and deposited around the most congenial *nuclei* presented to it, which would undoubtedly generally be the particles or pieces of reef-gold, or any other metallic substances for which it had an affinity.

"We find an interesting paper on this subject in the Transactions of the Royal Society of Victoria, 1867, by Mr. C. Wilkinson, in which he mentions some facts bearing on the subject. It appears that Mr. Daintree, formerly of the geological survey of Victoria, had on one occasion prepared for photographic uses a solution of chloride of gold, leaving in it a small piece of metallic gold undissolved. Accidentally some extraneous substance, supposed to be a piece of cork, had fallen into the solution, decomposing it, and causing the gold to precipitate, which made a deposit in the metallic state, as in the electroplating process, around the small piece of undissolved gold, increasing it in size to two or three times its original dimensions. Considering this accidental experiment of Mr. Daintree's as in some measure supporting Mr. Selwyn's theory, Mr. Wilkinson followed it up by a few simple experiments in the same direction, which he details in his paper. In his experiments a small chip of wood was generally used as the decomposing agent. In one instance he used a piece of leather. All through the wood and leather gold was disseminated in fine particles, and, when

cut through, the characteristic metallic luster was highly reflected. From various experiments it would appear that organic matter is the necessary chemical agent for decomposing a solution of the chloride of gold in order to precipitate the gold as a coherent coating around a nucleus; and that, so far as Mr. Wilkinson had yet tried, iron, copper and arsenical pyrites, galena, antimony, molybdenite, blende, wolfram, and metallic gold constitute essentially favorable *nuclei* to determine this chemical reaction. It is to be observed, too, that organic substances, such as fragments of wood, roots of trees, etc., occur abundantly in the gold drifts of Australia.* If water holding gold in solution circulates through the rocks and drifts, all the conditions necessary for the production of gold dust and nuggets by deposit are present."

*The fossil trees in the hydraulic mines at Dutch Flat and in other parts of the State are so abundant that they form a serious impediment to the miner.—C. B. T.

CHAPTER X.

GOLD MINING.

IN California, where mining has been the leading, and sometimes, almost the only industry, the tourist naturally desires a clear and concise statement of the means employed in obtaining the precious metal. The following table may aid him:

GOLD MINES IN CALIFORNIA ARE:

Placer—gold imbedded in clay, sand, gravel.

Quartz—metal encased in rock.

We will in this volume treat only of the former.

PLACER MINES ARE:

Shallow—"pay-dirt" near surface.

Deep—"pay-dirt" over twenty feet beneath surface.

LOCATIONS OF "SHALLOW MINES."

Beds of ravines, or gulches; shallow flats; sand bars in rivers.

LOCATIONS OF "DEEP MINES."

Hills, deep flats.

Placer mines are also classed according to topographical position, and the methods employed in working them.

TOPOGRAPHICAL CLASSIFICATION.

Hill Claims—"pay-dirt" in, or under a hill.

Flat Claims—"pay-dirt" found on flats.

Bench Claims—"pay-dirt" found in narrow table-land on hill-side, above a river.

Gulch Claims—"pay-dirt" found in gullies destitute of water during part of the year.

Bar Claims—gold in low collections of sand, or gravel, in rivers—exposed at low water.

River-bed Claims—gold in beds of rivers—access gained by turning river from its course.

Ancient River-bed Claims—gold found in beds of rivers now extinct.

OPERATIVE CLASSIFICATION.

Sluice Claims—worked with sluices.

Hydraulic Claims—worked by hydraulic power.

Tunnel Claims—auriferous earth taken out of tunnels and subsequently washed.

Dry Diggings—earth excavated in summer and washed in winter, when water is plenty.

Dry Washing—fine soil blown away, leaving the gold.

Knife Claims—gold dug from crevices with knife, or spoon.

The gold was probably all originally encased in veins, which varied in width and extent in different localities. The breaking and grinding of the glacial epoch, and the disintegration of more recent ages, has partially or wholly freed the gold from its rocky bonds. The eroding streams have dislodged the particles of gold from the place where they were previously deposited, and have carried them with the current until some rock, sand-bar, or hollow basin, has offered them a resting place. Here we find the principles of the two kinds of mining which have

been employed in California. The glacier was the prototype of the quartz mill; while aqueous erosion is but Nature's system of hydraulic, or placer mining.

The present streams still continue their work of depositing the foreign matter which, either by natural causes, or the labor of man, enters their waters. The nature of the substances which the current carries down stream regulates, in a great measure, the manner and location of deposit. If large boulders are transported, they are pushed by the current along the bed of the stream until they reach a point where they successfully resist the diminished force of the water, or become lodged against some impediment in the stream-bed. If logs, or tree trunks, are carried away, they float on the surface until the stream widens and becomes so shallow that they are imbedded in the bottom, or on the banks. When boulders, or tree-trunks, lodge at the bottom of a stream, they form *nuclei* for collections of pebbles, sand, or mud, and begin the formation of sand-banks and bars. When logs lodge in such a manner that they permit stony and earthy matter to pass by them, and only intercept objects floating on the surface, they produce the snags which interfere with inland navigation, and form the jams on logging streams. Thus river-bars are formed around a nucleus—either organic, or inorganic. The coarser gravel only is first detained, and as the structure progresses, sand and mud are added. Along the upper end of these bars floating particles of gold find a lodgment. Thus originate the "river-bed claims," to mine which the streams are turned from their courses; "bar-claims,"

where the gold is mined at low water; "bench-claims," where the bars are on narrow table-lands, once the beds of rivers; and "flat-claims," where the wash of rivers has been spread over a level space of country. Some "hill-claims," or mines in which the gold-bearing dirt lies under an accumulation of non-auriferous soil, have evidently been formed as bars, and, in the changes of time, have been covered to a great depth by the wash of other streams. "Gulch-claims" are formed, as are those of river beds, with the exception that a small quantity of water has been the agent.

According as the "pay-dirt" is near the surface, or remote from it, placer mines are shallow, or deep.

The manner of working these various claims demands notice. The beds of streams along which auriferous-earth is carried are more or less rich in gold. Owing to the swiftness of the mountain streams the only way of reaching these "river-bed claims" is to turn the water into some other channel. In working on river-bars it is not usually necessary to turn the course of the river, as work is deferred until late in the season, when the streams are low. Deep claims are reached by shafts, or, more generally, by tunnels, through which the auriferous soil is transported, and it is afterward washed at some convenient locality. Ancient river-beds are also reached by tunnels, the gold being treated in the same manner as that obtained in the hill-claims.

In the early days of mining in California "river-bed" and "bar-claims" were called "wet-diggings," in contradistinction to the "gulch" and "flat-claims,"

denominated "dry-diggings," where water was obtainable during but a part of the year, if at all. When the "deep placers" began to be worked, and the extensive and complex system of ditches and flumes, which now traverse the Sierra foot-hills, was first planned, the names "wet" and "dry-diggings" were discarded, and others more appropriate substituted. In the early days of mining in this State, when "gulch," or "flat-claims," were found very rich, and no water was obtainable to dissolve the soil, a mode of working, since discarded, was employed, and called "dry-washing." The richest dirt was placed on a raw-hide that was laid on the ground. The miner then pulverized the earth, throwing out all the pebbles with which gold-bearing soil is filled. This done, the fine dust was put into his pan, and by repeatedly throwing the dirt into the air and catching it in its descent, the earth was all blown away, and the metal remained.

The tunnels which are run into hills are usually seven feet high, and about five wide. The drift is generally run on a level, or with a sufficient ascent to facilitate the draining of the claims and the excavation of earth. Occasionally a tunnel is run down so as to avoid some rock ledge above, but unless there is a draining tunnel beneath, much difficulty is experienced from the water which may be in the hills. Tunnels generally require timbering to prevent the earth from caving, and it is frequently necessary that heavy planking be placed against the side walls also. Thus it will be seen that a tunnel is an expensive structure in some places, especially

where timber is scarce. Shafts are usually dug for the purposes of prospecting. But in some localities, where the "pay-dirt" cannot be more easily reached with a tunnel, the auriferous soil is hoisted through a shaft.

Before describing the modes of mining at present generally adopted, it will not be amiss to state the methods of obtaining the gold in the "Fall of '49 and the Spring of '50." It was not until about 1852 that what has become known as hydraulic mining was begun. The crushing of the rock to free the metal was a feature of Californian mining of still later introduction. Those who first came to the State were usually supplied with three tools—a pick, a shovel or spade, and a pan.

The pan is usually made of sheet iron, which does not amalgamate with mercury and is stronger than tin. Its diameter is about twelve inches, while the sides are six inches high, rising from the bottom at an angle of about forty-five degrees. The pan is the simplest instrument employed in the separation of gold from the soil in which it is found. It is partly filled with dirt and held under water. A gentle shaking aids in dissolving the dirt. Thus a thin mud is formed which is carried away by the clear running water. The gold dust and pebbles settle to the bottom, where quicksilver is frequently placed, and the gold is retained by amalgamation. The pebbles are thrown out, and the metal removed. An inexperienced hand loses considerable gold, but an expert in this process can make a good living in many parts of the State at the present day, although "shallow

mines" are not generally regarded as "paying." Except for the purposes of prospecting, the pan has passed out of general use, and the rocker, a later invention, has also with it gone into disuse.

The cradle or rocker looks somewhat like a child's cradle, and is provided with two rockers. The instrument consists of a box about three and a half feet long, nearly two feet wide, and four inches deep. One end, which is open so as to allow the escape of water and earth, is lower than the other. Across this "cradle-box" two riffle-bars are placed. These are strips of board, about one inch square, which are fastened in the bed of the cradle—one near the middle and the other at the end of the box—for the purpose of catching and retaining the particles of gold. At the elevated end of the cradle is the "hopper." This is a square box with a length equal to the width of the cradle, and it is about four inches deep. It is not securely fastened to the cradle, but may be lifted off when desirable. The bottom of the hopper or "riddle-box" is of sheet iron, perforated with holes, that, in diameter, do not exceed half an inch. Under the hopper an "apron" of either wood or leather is securely fastened to the sides and inclines toward the upper end of the cradle. The miner places dirt in the riddle-box. The "cradler" sitting beside the machine, with one hand rocks it gently as with the other hand he dips water from the stream or pool by which he works, and pours it upon the earth in the hopper. The soil is dissolved, and the muddy water sinks through the bottom of the riddle-box upon the apron, which, by its inclination, sends it to the upper

end of the cradle-box. Hence it flows over the riffles and escapes through the open lower end. The gold, together with the heavy black sand, is retained by the riffles. The traveler will, in mining districts, see many Chinamen patiently working over the "tailings" or refuse left years ago by Caucasian miners.

Another instrument which is used in but a few parts of California at the present day is the "pudding-box." This is made of rough boards. It is about six feet square and a foot deep. Very tough clay that cannot be worked successfully otherwise, is thrown into this box together with water. A man stirs this mass until it is thoroughly dissolved. He then removes a plug, a few inches above the bottom, and allows the thin mixture of earth and water to escape. The heavier portion with the gold remains, more water is added, and the process repeated. When sufficiently separated in this manner, the pan or rocker is called into requisition to complete the work of parting the gold from the tenacious earth.

The board-sluice was, for a time, an important auxiliary in gold mining. A trough of rough boards is constructed, not less than fifty feet long, and often several hundred or even thousand feet in length. The maximum width is one foot, and it varies from one foot to five feet in width. Riffles in the sluice serve to detain the gold which is also held by quicksilver. Through the sluice a stream of water constantly runs, the dirt is shoveled in, and as the soil dissolves and is carried away, the gold sinks to the bottom.

Hydraulic mining is now extensively used. Early in 1852 the miners in the Sierra foot-hills were generally impressed with the fact that some other mode of obtaining the precious metal must speedily be adopted. Many had made money by picking the gold from crevices with knives and spoons, but this could no longer be done. The earth near the water-courses had been mined over with pan or rocker. The sluice had been employed for ground more remote from water, but that means of mining had ceased to make a rich return. Many had discovered by shafts and tunnels that very valuable deposits were to be found in strata deeper than those which they could readily reach. "In the spring of 1852, a miner, whose name is not remembered, put up a novel machine on his mining claim at Yankee Jim, in Placer County. This machine was very simple. From a small ditch on the hill-side a flume was built towards the ravine, where the mine was opened; the flume gained height above the ground as the ravine was approached, until finally a 'head' or vertical height of forty feet was reached. At this point the water was discharged into a barrel, from the bottom of which depended a hose, about six inches in diameter, made of common cow-hide, and ending in a tin tube, about four feet long, the latter tapering down to a final opening or nozzle of one inch."*

Thus, like all great things, did hydraulic mining have its small beginning. The hose made of raw leather soon rotted, not only becoming very offen-

*Charles Waldeyer, of Cherokee, Butte County, California, in United States Mining Industry. Raymond, N. Y., 1874, p. 390.

sive, but also utterly useless. Some sailors adopted canvas, and that has since continued to be used in many places, for conducting the water; in other localities iron pipe has superseded sail cloth.

The nozzle has undergone many changes and improvements. Inventive genius was immediately called into requisition to perfect the instruments of the new method of mining, which was attracting universal attention. The nozzle received a great share of notice. Numerous nozzles are in use, but the detailed description of their various styles would occupy too much space here. The general form is that of a tapering metallic tube, which moves in a ball and socket joint in the metallic end of the pipe or hose which conducts the water upon the auriferous earth.

When a way was opened to the miners by which the "deep placers" could be profitably worked, it was but natural that many should eagerly engage in the enterprise. But there were many items of heavy expense that appeared to only a few of the more far-sighted speculators. These were not slow to avail themselves of all the advantages which the new system placed at their disposal. Large Ditch Companies were organized, surveys were made, water rights located, and mammoth ditches, and extensive flumes constructed. Miniature rivers brought in artificial channels, down the mountain sides from the regions of never-failing snow, were led to every mining camp. When a system of ditches was first instituted in 1852, investments in it brought large returns. Water was scarce in the mining sections, from the fact that the stratification of the slate-rock had made springs im-

possible here. A bountiful supply now enabled the miners to work their claims more extensively. But when one large ditch scheme was superseded by a grander, the supply began to exceed the demand. Immense expense had been incurred in the construction of uncalled-for ditches. Labor was high, and extravagant wages were paid by rival companies desiring to first reach a common destination. Costly flumes were built, which, owing to subsidence and decay, as well as to their frequent destruction by snow-storms, cost large amounts for repairs. Bad engineering also caused much unnecessary expense. The companies who had engaged in the construction of these works became bankrupt, with liabilities of several millions of dollars. "It is estimated by competent men that not less than $20,000,000 have been invested in the mining ditches of California, and that their present (1868) cash value is not more than $2,000,000."* In many localities the high water-rates prevented the miners from working their claims, and in others when the miner had become indebted to the Ditch Companies for water, beyond his capacity to pay, he transferred his claim to cancel the obligation. Thus Ditch Companies became owners and workers of mining territory. In some parts of the State one Ditch Company has absorbed one after another of its less prosperous rivals until it has become a gigantic monopoly. We may, as an example, mention the California Water Company of El Dorado County. This company has obtained possession of

*Resources of the Pacific States and Territories, J. Ross Browne. S. F., 1869, p. 180.

very extensive water privileges as well as other valuable property.

We have thus far mentioned two of the important requisites of hydraulic mining; gold-bearing earth, and an abundant supply of water. The third indispensable necessary is facilities for the outlet and deposition of the great amount of tailings, or *débris*. As a ton of earth returns but a very small amount of gold, when we consider the large quantities of precious metal which has been obtained by washing earth, it will be evident to the most casual observer that the tailings which have been washed from the hill-sides down into the valleys and rivers, have been enormous in amount. Here a question of grave import arises, which has led to long and bitter contentions between the miners and agriculturists of California.

The agriculturist affirms: that prior to the extensive removal of soil from the hill-sides, many rivers of the State flowed through alluvial bottoms; that these meadow-lands were extremely fertile; that the washing of tailings in the rivers has resulted in filling up their beds, until in the overflows large quantities of volcanic *débris*, gravel, and sand, have been deposited on productive agricultural lands; that the lands have thus become impoverished; that the loss to the State by the ruin of these farming lands, and the destruction of the improvements thereon, has reached many millions of dollars; that the transient gain from the mines has been far less than the constant returns from the lands would have been had they not been rendered valueless. He also asserts

that large tracts of forest land have been destroyed, the State being thus deprived of much valuable timber; that the soil has been washed away to the bedrock in vast areas; that these tracts are useless for all purposes, and are rapidly enlarging; and that many streams, formerly navigable, have been filled up to such an extent as to stop navigation, and necessitate extensive canals and railroads; that the bays of California have been impeded by the deltas from these mountain streams, and in a comparatively brief period the greater portion of these bays will be useless for the purposes of commerce.

The miner pleads: that mining was the first great interest in the State, and that to which California owes its rapid growth; that as the miners came before the farmers, they have a prior right; that unless outlets are granted the mines cannot be worked, and the State will thus be deprived of many millions annually furnished by the hydraulic mines. He also claims that fine gold has been deposited in these alluvial bottoms until they should be considered rather as mineral than farming lands. The miner also pleads, that if an outlet for the tailings is denied him, his expensive ditches and other structures will be useless.

Careful legislation is required to adjust these counter-claims. The mining interests should not be overlooked, neither should the soil of the State be irreparably injured for the gold which is obtained by hydraulic mining. A loss of the many millions annually added to its wealth by mining cannot affect the State of California as materially as the per-

manent forfeiture of large forest belts, and of thousands of acres of valuable farming lands, with consequent loss to commerce.

We may well consider a few of the mechanical appliances used in hydraulic mining. Mention has already been made of the flumes, ditches, and iron pipes which conduct the water to large reservoirs, from which it is drawn in desired quantities, and conducted through iron pipe to the nozzles, through which it rushes with terrible force against the bank to be excavated.

We will now, as briefly as possible, describe the sluice-boxes which carry the water and earth away from the mine, catch the gold, and conduct the tailings out of the miner's way. A sufficient fall from the head to the bottom of the sluice-box is an all-important consideration. This grade varies from three inches, in twelve feet, where an abundant and cheap supply of water is at hand, to nine inches, in the same length of sluice-box, when the supply of water is limited. These grades may be considered as extremes. From four and a half to six inches fall in twelve feet is about the normal grade.

In arranging the grade of a sluice-box many important questions are involved. One of the greatest being the establishment of "under-currents." These are large, flat boxes, generally varying from thirty to fifty feet in length, and from ten to twenty feet in width, and often containing a surface of from 500 to 1,000 square feet. These boxes are provided through their whole extent with riffles, as we have seen in the rocker, which catch the gold, or amalgam. The

"under-current" is beside and a little below the main sluice-box. An opening from fifteen to eighteen inches in width is cut in the bottom of the sluice-box. Over this a frame-work of steel bars, about one inch square, and an inch apart, allows the fine particles of sand and metal to drop into a sloping box. This box has a pitch of about one inch in a foot. Through this box the finer materials reach the broad area of riffles, while the coarser gravel and cobble-stones are carried down in the main sluice-box. The water which flows into the "under-current" afterward unites with that in the sluice farther down from the mine. The cobbles and small boulders are next disposed of by "a grizzly," or a grate of parallel bars which permits the finer particles to pass down through the sluice, while all stones are thrown out of the sluice altogether. If a "grizzly" is used, a drop of a few feet is necessary, as the material which passes through the grating must drop into a series of sluice-boxes underneath, and is thus carried farther from the mining ground. Should a precipice be along the line of sluice-boxes, a "grizzly" may be most profitably constructed, but otherwise the accumulation of refuse thus thrown out of the sluice soon prevents farther deposits. When a "grizzly" is made, and a precipice is at hand, a great amount of wear on the sluice-boxes below is prevented. Then a frame of iron bars, which may be condemned iron rails, is made, extending beneath the end of the higher sluice-box and above the drop-box, into which the finer matter falls. The bars of the frame-work are placed

parallel to each other, towards the cliff, and about six inches apart. The whole frame slopes at an angle of about 30° towards the cliff, over which stones of more than six inches in diameter may be rolled, while strong wooden sides prevent their escape in any other direction.

A sluice is constructed of boards resting on strong sills, laid four feet apart. These sills are usually four inches by six, and for a double sluice, about fifteen feet long. The advantage of a double sluice is that the mining can be prosecuted at the same time that one of the sluice-boxes is "cleaned up." The sluice-box is from four to six feet wide, and for the latter width, about three feet deep. The sides are supported by posts, four by five inches, and strongly braced. The floor and sides of the sluice-box are made of plank one and a half inches thick.

The paving of the sluice next requires attention. This is sometimes done with hard, flat rocks, standing on their edges, and so placed as to be least effected by the flow of water. These rocky pavements are from ten to twelve inches thick. Separate compartments, formed by pieces of stout plank permanently fixed across the bed of the sluice-box, from six to eight feet apart, prevent a great displacement of the rocky pavement, should any stone give way. Above the stone pavement the sides of the sluice-box are lined to the height of about a foot with two-inch plank, to save the real sluice from the wear of the gravel. Square blocks, about ten inches deep, are also used for pavement, especially where the sluice is in a tunnel, as the work of taking out the pavement,

for the purpose of obtaining the gold there retained, is, in this way, greatly facilitated. These blocks are made of wood and fastened together in sections, with a space of an inch and a half, extending across the sluice, between the rows of blocks.

In hydraulic mines the work is done by the united forces of water and powder. The latter is employed only to shake the bank, so that water will more easily effect its removal. The hydraulic nozzle is directed against the bank of earth, and a strong head of water is turned on. A stream, from five to seven inches in diameter, apparently as rigid as a bar of steel, plays against the yielding earth. A hole, which rapidly enlarges, is ploughed out of the soil, until at length a portion of the bank caves, and is washed down into the sluices. If the earth is very tenacious, a tunnel is dug into the mine, and cross-drifts, of various forms, connected with it. In these drifts large quantities of powder, from a few hundred, up to two thousand, twenty-five pound kegs, are placed; connection is made by electric fuses, the mouth of the tunnel filled up, and the blast set off. The soil thus shaken can be removed by the stream of water. To work some mines, extensive tunnels must be dug through the wall-rock to reach the rich deposits in former river-beds. From the tunnels, drifts, or chimneys, are dug into the rich deposit, and a shaft is excavated. The earth is then washed down from above into the shaft, and is carried away in a series of sluices extending through the tunnel.

We have mentioned that quicksilver is put into sluices to detain the gold. The minute particles of gold form an amalgam with the mercury. The quicksilver, therefore, must be exposed to the gold as much as possible. With this intent, at first only a small amount of washing is done through the sluices, that the spaces between the stones, or blocks, of the pavement, may become partially filled with earth. The quicksilver is then introduced. It is scattered in a light spray all along the sluice. The first charge of quicksilver is between five and six hundred pounds for five thousand feet of sluice. After that the daily charge, applied twice a day, is about one hundred pounds. Much of the quicksilver is regained when separated from the gold.

"Cleaning up" is done usually once or twice a month, though in some places it is performed oftener. The pavement of the sluice is gradually taken out, while a small stream of water is applied to move the sand and fine gravel. The amalgam is scraped up, and put into iron, or wooden buckets.

The quicksilver is then separated from the gold. A quicksilver bath divides the gold from any base metal which may have combined with it. The free mercury may then be obtained by straining through a filter of canvas. After this the amalgam is washed in a bath of water and sulphuric acid, when the mercury is considered pure. The gold and remaining quicksilver is now placed in a retort. The mercury is vaporized by heat, and after passing through a tube, is condensed in water. The pure gold is then removed.

A considerable percentage of the gold is lost in hydraulic mining, in great measure on account of the rapidity with which the work is prosecuted. Fine flour gold has not time to settle through the thick water, and is carried off in the tailings.

CHAPTER XI.

TO THE YOSEMITE.

IN the preceding pages we have described at considerable length the rail-way ride to Stockton, which is the same for all the routes to Yosemite, except that those who journey to the Valley by way of Mariposa, or Coulterville, change cars at Lathrop, and thence proceed to Merced. We have noticed the points of interest along the Stockton and Copperopolis Railroad, as far as Milton, as well as scenes along the stage route to Murphy's, and thence to the Calaveras Mammoth Trees. At the latter place we stopped, and subsequently visited the South Grove, and Cave City, thus gaining many views of fine scenery, as well as an opportunity of witnessing the utter desolation of some mining camps, that in former days were flourishing towns. We have spent a part of our time in this section in making a brief survey of the gold-mining districts of the State, and have noticed some interesting theories relative to the formation of this section of the country, as well as to the origin of gold mines, and the manner in which the golden *detritus* has been deposited in the placer-mining section. We have studied the methods by which the gold has been mined, tracing the

water from the time it left crystal springs in the lofty regions of perpetual snow, through ditches, flumes, and pipes, until we have seen it tearing down banks of red earth, leaving the bed-rock bare, except in places where piles of rock have been thrown aside, or where, perchance, on some untouched pinnacle of earth a dead pine stands—a monument to the departed grandeur of the virgin forest.

We are now prepared to proceed on our journey, which will first lead us through the section of the Southern Mines, and afterward among the imposing forests of the heavy timber belt of the Sierra Nevada, until suddenly we emerge at the brink of a narrow, rocky gorge, and look down more than three thousand feet upon the green meadow-lands of the Yosemite Valley. There to trace the wandering Merced, as it glides from one thicket to another, and finally disappears from sight as it dashes over immense boulders through the cañon which is the western continuation of the valley.

All the routes to the Yosemite must of necessity be very similar in many respects, traversing as they do for a great portion of their length the region of the foot-hills. Each, however, possesses points of interest peculiar to itself, and the tourist will do well to travel by more than one of them. Having visited the Calaveras Mammoth Trees, we will continue our journey by what is called the Big Oak Flat route. This has become more generally known than the other roads to the Yosemite, because the Calaveras Trees were the first large ones discovered and made accessible, and travelers after seeing them journeyed

over the mountains to the Yosemite. This road has also always been more generally traveled, because for a number of years it presented the least distance to be passed on horseback, and also because it lies through what is usually conceded to be the most interesting country in the vicinity of the famous cataract.

The distance from Murphy's to the hotels in the Yosemite Valley is eighty-five miles, all of which is traveled by stages.

After leaving Murphy's, we retrace our steps as far as Vallecito. From this point we begin to wind through the foot-hills clothed with chaparral, rich also in a growth of fragrant wild lilacs (*Ceanothus*) and gnarled manzanitas.

As we wind up the browned mountain side, where at this time—the first of June—but a few scattered wild flowers relieve the stretches of dry grass, we notice in the cañon below, Coyote Creek, along which much mining has been done, and where still a few claims yield a profitable return to labor. Joaquin Miller's words are very applicable to this stream apparently lying motionless between the baked hill-sides:

> "Here winds a thick and yellow thread,
> A moss'd and silver stream instead;
> And trout that leap'd its rippled tide
> Have turned upon their sides and died."

Coyote Creek is so similar to many streams that are found in the foot-hill region that it seems to scarcely merit notice. Yet, down in that cañon, unvisited and generally unknown to the tourist, are

two interesting curiosities. Some one may notice as the stage passes a board sign on a tree, at the right, which points down a winding trail, and bears the inscription, "To the Natural Bridges." Should you be fortunate enough to have the seat with the driver, which you should always secure when possible, he will probably give you an account of the bridges.

As the stage does not stop, few ever visit these spots. Although that form of Nature's masonry called a bridge is found in almost every section of the country, each possesses some charms particularly its own. These bridges are not without special attractions. Following down the course of the stream, we approach a fine Gothic arch, spanning the creek. This arch rises in the centre about thirty feet above the Tiber-like stream. The distance from pier to pier is perhaps twenty-five feet. Above this vaulted entrance lies a thick mass of stone and earth, crowned with shrubs, which conceal the hard lines of rock. We pass under this stone entrance, following the side of the creek, and soon find ourselves walking through a noble and natural Gothic vestibule, which opens into a room about forty feet wide and fifty feet high. This large cavity strikingly resembles a Gothic cathedral. At some places along its wall masses of limestone look like dilapidated stone altars, while a few stalagmites resembling half-consumed candles, and a spring of clear water bubbling, as if for baptismal purposes, into a natural stony font, heighten the illusion. The sediment from the muddy stream has, during high-water, been deposited on the altar-

like projections, and might almost be mistaken for the accumulated dust of some deserted apartment.

> "Nature played with the stalactites
> And built herself a chapel."

As we proceed under this natural bridge we notice around us many interesting objects, among which is a mass that greatly resembles a boisterous cascade instantly stiffened with ice. As we approach the lower end of the passage, the roof gradually nears the water until, at the place where we emerge, it is not much over five feet above the stream. This bridge is nearly three hundred feet wide.

The second bridge is about half a mile farther down stream. This is somewhat similar to the one above described. The entrance is less Gothic, more nearly resembling a large arch. The interior chamber is not as high, the roof being but about fifteen feet above the floor, and shaped like a dome. These bridges form part of the limestone belt which has been before mentioned, and will afford much pleasure to the traveler.

We now return to our main journey and climb the side of Table Mountain. Occasionally unique views of foot-hill scenery present themselves. The next ride is down the mountain to Abby's Ferry, on the Stanislaus River, the boundary line between Calaveras County, which we are just leaving, and Tuolumne County, through which the remainder of our journey will mostly lie. While waiting for the ferry boat to be brought across the river, a digression in relation to this interesting section may be pardoned.

There are in California many flat-topped ridges, which have been styled table-mountains. The particular one of which we write is thus described in the California State Geological Survey Report:*

"The Table Mountain of Tuolumne County is a flow of lava originating in the lofty volcanic region, beyond the Big Trees of Calaveras. * * It comes down to the north side of the Stanislaus, forming a nearly continuous ridge, elevated more than 2,000 feet above the river. Just below Abby's Ferry, the Stanislaus has broken through the once continuous basaltic ridge, which has been irregularly worn away for some distance from the river, but which re-appears as a continuous mountain a little southwest of Columbia, and continues on the south side of the river, forming a conspicuous feature of the scenery as far as Knight's Ferry, a distance of about twenty miles from the point where it crosses the river and enters Tuolumne County. As seen from a distance, this Table Mountain reveals its origin at once in the contrast between the long straight line of its upper edge, and the broken and curving ones which the eroded hills of the auriferous slates everywhere exhibit. Its dark color and the comparative absence of trees or shrubs on its top and sides, also indicate very clearly that the material of which it is composed is very different from that of the surrounding hills."

In a previous chapter we have spoken of the large lava-flows which, during a former age, have buried immense areas of the Sierra Nevada to a great depth ;

*Geology. Vol. I., p. 243.

not only, as in Northern California and Oregon, extending over broad tracts, but, also, in some parts of California, filling up former river-channels, and at the present day appearing as long walls of compact lava. It may well be our pleasure, while in so favored a locality, to study more closely some of the many interesting features of these stone rivers.

The summit of the Table Mountain, which we see at this point, is a cap, from one hundred and forty to one hundred and fifty feet in thickness, of very dark colored lava, with a dense texture. No divisions are noticeable in its structure, the entire mountain ridge seeming the result of one great and uninterrupted volcanic flow. The width of this lava band is about 1,700 feet. The upper surface is almost perfectly smooth, and nearly level, with but a gentle slope from its source. But little soil has accumulated on its summit, and the vegetable growth there has been restricted to a few stunted shrubs. The lava appears but little affected by time. Its nearly perpendicular walls have been but slightly worn, except in a few places, where, as near Abby's Ferry, the Stanislaus has broken through the stony levee which checked its course. At some points, as we ride along, we see where the softer material beneath the lava has been worn away by water, exposing masses of the porous rock, some of which are still overhanging the tide, while others have fallen. Probably in this way the greater amount of dilapidation has been accomplished.

Beneath the lava a deposit of fine-grained sandstone is usually found. This latter is not very com-

pact, and generally disintegrates when exposed to the air. These sand-stone deposits are distinctly stratified, and lie in nearly a horizontal position. Among the lower strata are deposits of nearly white, and frequently beautifully laminated shales and clays. Also, in this location, are beds of gravelly materials, which adhere closely together, forming what the miners call "cement." Beneath all is the bed of the ancient river, or the "channel," where the "pay-gravel" is found. These beds of former streams present all the characteristics of recent river-beds. At one part of the Table Mountain of which we write the total thickness of the detrital masses directly beneath the centre of the lava deposit is stated by Professor Whitney to be fully two hundred feet. At the sides the thickness is less, owing to the rise of the auriferous slates which formed the banks of the Pliocene river, and which are called by the miner "rim-rock." Through this rock he frequently tunnels to reach the rich gravel-deposit in the bed of the former stream.

To the geologist, Tuolumne County presents a rich field for study. Many of the most interesting fossil remains which have been discovered in the State have been found here. In the strata of detrital material underlying the lava, pieces of wood, and sometimes entire trunks of trees, are found. These are almost always silicified, being changed into an opaline substance, sometimes called wood-opal. Among thin layers of "pipe-clay" impressions of leaves are occasionally found. These are said, on good authority, to belong to a flora entirely different from that

of California at the present time. These vegetable remains are believed to belong to the Tertiary period. This date for the deposits in the ancient river-beds, not at this place alone, but in other parts of California, is corroborated by the animal remains also found beneath the lava. Although these specimens are generally in a fragmentary condition, and are often entirely destroyed by the carelessness with which they are exhumed, enough has been learned to convince Professor Whitney, that prior to the great lava-flow the country then desolated was inhabited by "the rhinoceros, an animal related to the hippopotamus, an extinct species of horse, and a species allied to the camel," all of which, it would appear, became extinct during that great terrestrial revolution. Later, a new fauna appeared in the changed landscape. The mastodon and elephant, together with the tapir, bison (buffalo), and two species of horse, the latter undistinguishable from the present mustang, or Indian horse, at that time inhabited this section, and their remains have been found in great abundance in the more recent detritus of the gold region. The remains of these latter animals have not, so far as known, been found beneath the lavas: those overflows marking a distinct transition for this section from one fauna to another. The works of man have here, as in Europe, been found in close proximity to the remains of these animals. The inference can hardly be escaped that man made his appearance here during the age of the elephant. Mining is actively carried on beneath Table Mountain, where large quantities of gold have been

obtained. These mines were accidentally discovered in 1854. Up to this time almost a million dollars have been expended in tunneling under the lava.

We have been for some time discussing the formation of this interesting mountain ridge and looking at specimens of silicified wood and lumps of fine-grained "pipe-clay," containing leaf impressions, and kept for sale at extravagant prices in the little house by the river side. Meanwhile, the ferry boat has been brought across the river, and its prow has just touched the sandy beach. This swift river, like all the foot-hill water-courses of California, is very dangerous from the strong under-current that gives rise to the swift eddies visible at different points.

The ferry boat is made much like a common lighter, with flat bottom, square ends, and of light draft. A railing prevents accidents, for should man or beast fall overboard, death would be almost certain. But it is not so much the shape of the boat as the manner in which it is navigated that interests us. A very strong cable is stretched across the river, about five feet above the surface of the water, and is securely fastened to either bank. At each end of the ferry boat a strong rope is wound around a belaying pin and is also fastened to a pully that runs freely on the cable stretched across the stream. When crossing the river, the rope attached to the prow is lengthened and the stern rope shortened. This allows the current to bear against the stern of the boat and push it across, while the pulleys attached to the ropes that prevent the craft from being carried down stream present no obstacle to the onward motion. The speed

of the boat may, of course, be accelerated or retarded by lengthening or shortening the forward line.

After crossing the Stanislaus, we begin a long winding ascent. We get out and walk, thus relieving our cramped limbs, and the tired horses, and, as amateur botanists, taking great delight in gathering specimens of the flora of this region as we climb the mountainous road.

Reaching the summit of the hill, we make a slight descent and then wind among rolling lands, seeing around us multiplying tokens of mineral research. Presently we reach Gold Springs, formerly a noted mining camp. This is, indeed, an oasis in the desert of dry, rolling, chaparral-covered hills. On the left of the road is a copious spring, a very rare feature in auriferous districts, shaded by a large and symmetrical weeping-willow. The water is cold as ice and very refreshing. Professor Whitney supposes that this spring existed here during the period of the mastodon, and has continued to flow ever since. Considering it a favorite resort of those huge animals, he accounts for the abundance of their remains in the vicinity.

A fine orchard surrounds the spring and a comfortable farm-house is seen under the trees a few hundred yards off. The excellence of the fruit raised on the red earth of auriferous regions has been mentioned in a former chapter. The tourist will here have an opportunity of tasting the cherries and currants, or, at another season, the peaches and grapes.

We are now in an essentially mineral country. On all sides traces of hydraulic mining appear. Large

boulders have been uncovered in the artificial denudation of the country, and lie glistening in the strong sunlight. The "bed-rock" is seen exposed for large areas. Indeed all the beautiful superstructure of soil and trees has been removed, and nothing remains but the uneven underlying rock.

This apparently uninteresting bed-rock proves far from unattractive to a student of geological problems. This rock is a part of the great limestone belt which we have seen at Murphy's and Cave City. It has here been laid bare by mining to such an extent as to attract notice in several respects. Deep irregular cavities extend even to fifty feet in depth, which are seen to be longest in the direction of the stratification of the rock. These cavities have been greatly worn by water. In these fissures, which have an average depth of from ten to twenty feet, much gold has been found, for the rock has served the purpose of the pavement in a sluice. Another noticeable feature of this limestone region is the dikes of trap which, piercing the limestone, stand almost perpendicular, extending nearly at right angles across the trend of the limestone formations. These dikes are frequently many feet thick, and are confined to the limestone belt, not reaching into the slates lying near by. The limestone is, at one point, quite extensively quarried, and is valuable for monuments and for building.

We soon reach Columbia, having traveled fourteen miles from Murphy's, and find another mining town that has seen more prosperous days. The town was built in a beautiful vale. The earth around has been

mined off, and many of the houses and stores have been pulled down that the soil under them might be washed over. This village is, however, not as desolate as many of the towns through which we have passed. From 1853 to 1857, the amount of $100,000 in bullion was weekly sent from this place. "Columbia is noted for having produced more large nuggets than any other district of the State, and also for the high fineness of its gold."* The mines in the vicinity alone sustain this tottering town. Perhaps no more appropriate place may be found than the present for speaking of the great decrease in population throughout mining districts. While agriculture has been developing other parts of California and adding a permanent population, the mining area of the State has "been running down," the shallow placers have been nearly exhausted and a large number of men who, in early times, found employment here have drifted away to other localities. Many have rushed to Nevada, Idaho and Montana, while some have adopted more steady occupations. The following tables, compiled from the United States census of 1860 and 1870, will exemplify the decrease in six counties in which the leading industry is mining, and also the increase in the same number of agricultural counties:

Counties.	1860.	1870.
Calaveras	16,299	8,896
El Dorado	20,562	10,326
Placer	13,270	11,376
Tuolumne	16,229	8,171

*Resources of the Pacific Slope, J. Ross Browne, p. 35.

Tulare	4,638	3,782
Yuba	13,668	10,865
Total	84,666	53,416
	53,416	
Decrease	31,250	

In other portions of the State the increase has been as great as the decrease in the six counties enumerated:

Counties.	1860.	1870.
Contra Costa	5,328	8,468
Humboldt	2,694	6,109
Los Angeles	11,333	15,100
San Joaquin	9,435	21,064
Solano	7,169	16,396
Stanislaus	2,245	6,510
Total	38,204	73,647
		38,204
Increase		35,443

Four miles beyond Columbia we come to Sonora. This town was first settled by a party of miners from the State of Sonora, Mexico, in the summer of 1848. The rich placers around it caused the little settlement to grow very rapidly, so that in the next year its population was estimated at nearly 5,000. Many fires have swept over the town, and this fact will explain the number of brick stores with iron shutters, and many other precautions which are here used

against fire. At the present time the mines in the immediate vicinity are generally exhausted. Still Sonora presents a much better appearance than most towns in the mineral belt. It is the trade-center for a large extent of country, and its principal long crooked street is lined with various and apparently prosperous stores. The heat in Sonora is excessive during the middle of the day. Should the tourist linger three or four hours in the place, he will find the high temperature not much alleviated by broad awnings and frequently sprinkled streets. He will have a good opportunity of estimating the summer heat of a foot-hill town, and will sigh for—

> "A little one-story thermometer
> With nothing but zeros all ranged in a row."

But when we think how exhausting is travel over the dry hill-sides, we do not regret that the stages wait here until the heat has in a measure abated. The traveler through this region will find a supply of good lemons desirable. Throughout the foot-hills the water is usually warm, and lemon juice renders it more palatable.

Sonora is the county-seat of Tuolumne County. This county is quite irregular in shape. Its northwestern boundary is the Stanislaus River and its north fork, which separates this district from Calaveras County. Alpine County lies along the northeastern line. Mono County bounds Tuolumne on the east. Fresno and Mariposa Counties lie to the south. Mariposa and Stanislaus Counties lie along its western border. The average length of Tuolumne County is sixty miles, its average width thirty-five, and its area

is 915,000 acres. Mining has been extensively followed in the western portion of the county. The eastern part lies in the heavy timber belt of the Sierra Nevada. There lumbering has been extensively carried on. At present but a small part of the county is under cultivation, although the soil of the western portion, from the foot-hills to an elevation of 2,500 feet in the Sierras, is unequaled in the productiveness of its orchards and vineyards, and the flavor of fruit is here remarkably good.

Charles Nordhoff* has made an observation true not only of Sonora but of many other towns to which fine farming lands are adjacent, but around which the gold is still so abundant that a little exertion will furnish pocket money for some time.

"The gold is still a curse, a clog; if it were gone, men, women, and boys would cease to think of it, and the four bits and the circus money would be earned by some industry useful to the general public. But now they live on in careless ease, enjoying their delicious climate, eating in the season the finest fruit of California; careless of the future, for there is no winter, and a miner can live comfortably in the hills for ten dollars a month; and recounting to each other the past and faded glories of Sonora, and their hopes that by the success of quartz-mining and the development of agriculture, its prosperity may some day be revived."

There is little new to interest us in the twelve miles' ride to Chinese Camp. We see on the right

*California for Health, Pleasure, and Residence. Charles Nordhoff, N. Y., 1874, p. 99

the long wall, Table Mountain, the most striking feature of the landscape.

Chinese Camp, another decaying mining town, is situated in a basin or flat east of Table Mountain, at an elevation of 1,300 feet above sea level. The Mother Lode, previously mentioned, lies about a mile east of the town. The chief industry here has been placer mining. The gold is very fine, but the supply has been mostly exhausted. Like all the towns of the region this one has a peculiar history. The early events of nearly all mining camps possess a tragic interest. Persons from all parts of the world flocking hither formed a strange population. Many brought their vices with them, and left their virtues at home. Each of these towns had its John Oakhurst and its "Cherokee Sal," but in almost every camp the noble qualities of an occasional "Kentuck" gave some light amid the general moral darkness.

Chinese Camp is the point where those passengers by the Big Oak Flat route, who do not visit the Calaveras Mammoth Trees on the way to the Yosemite, take the main stage from Murphy's and Sonora. By this route the traveler passes through a part of the Salt Spring Valley, before described, and stops a few moments at Copperopolis. The ride is mostly over a dry and uninteresting country, while its only recommendation is that those who travel by the Big Oak Flat route save both time and distance if they do not care to go to the Calaveras Mammoth Trees, and the interesting mining region around Sonora. There is a good hotel at Chinese Camp, where those who leave

the Yosemite by the route we are describing spend the night.

After leaving Chinese we climb a gentle slope passing under one of the high flumes of the section, in which water is conveyed to mining camps in the neighborhood. We then wind down a steep hill-side and at its base ford Wood's Creek, which, a short distance to the right, unites with the Tuolumne River. Along Wood's Creek much mining has been done. The Mother Lode is intersected by this stream, and in 1861 several quartz mills along the creek were engaged in crushing rock from neighboring mines.

Jacksonville is on the banks of the Tuolumne River, near where Wood's Creek empties into the former stream. Of this town only a hotel and a few other buildings remain. At this point the Tuolumne makes a sharp turn to the left. During the high water of 1862, the Tuolumne became so much swollen that the narrow cañon through which it flows, just below Jacksonville, did not permit the accumulated water to escape with sufficient rapidity. The stream backed up into the mouth of Wood's Creek and speedily the Tuolumne at this point was thirty feet above high water mark. The hotel-keeper will show the tourist a mark, made by him at the time, to indicate the height of the water, on one of the large oak trees which surround his house and prevented its being washed away by the flood. He will also tell of the livery stable and church carried away among other buildings, and that some miners' cabins were swiftly borne away by the tide, while their tenants were employed in cooking breakfast.

For about two miles after leaving Jacksonville we ride along a well-graded road cut in the hill-side a short distance above the Tuolumne. The river is here a broad muddy stream, apparently almost motionless, except where underlying rocks cause dangerous eddies. A mile from Jacksonville we reach Pray's Garden. Here fine fruit trees are growing, and apricots and cherries are for sale. In the first part of this volume mention is made of oleanders near the Tuolumne River. It is at Pray's Garden that these fragrant trees were seen. Here also, as at Columbia and throughout the foot-hills, roses abound.

A mile beyond Pray's Garden we come to Stephen's Bar, on the Tuolumne. At this place we cross the river by ferry, the boat being of the same description which we noticed on the Stanislaus. A place is pointed out on the other bank of the river, where quite a town once stood, of which not a single vestage remains.

Soon after crossing the Tuolumne, we ride in the bed of Moccasin Creek. In the summer this broad water-course is nearly dry. In winter the creek is very wide, and at some times is impassable from the amount of water and the frequency with which the channel changes. The stream-bed is covered with flattened cobbles, averaging six or eight inches in diameter. Moccasin Creek is a type of many streams in California, that, during the rainy season, are rushing torrents and in summer are completely dry. Such a stream is here called an *arroyo* (ar-ró-yo).

For about three miles we follow the bank of Moccasin Creek, and after crossing a bridge we draw up

at Newhall and Culbertson's Vineyard, where the horses rest before beginning the ascent of the longest grade of this road. The vineyard is quite extensive, and about one thousand gallons of white and red wine are here manufactured every year.

We presently begin the ascent of Rattlesnake Hill. The grade here is nearly three miles long. Many prefer to walk part of the way. Along the hill-side we notice granite wood, Indian arrow, manzanita, pipe-wood, mountain mahogany, and various shrubs which, when cut at the proper season admit a very high polish. Here also, as in many other localities, we see the soap-root. This is a peculiar plant with a bulbous root surrounded by tough fibres. The outer portion is sometimes divided from the bulb and sent to San Francisco for the manufacture of hair-mattresses. The bulbous root contains a great amount of *saponine*. If rubbed in water a soapy lather is produced. The root was used by the Indians and early Spanish settlers for removing dirt. The flower stalk is sometimes four feet high, destitute of leaves, but plentifully supplied with branches about eighteen inches long, from which many flowers are suspended. The flowers are small, white, and revolute. The species here seen, which is abundant throughout a great part of the State, is *Chlorogalum pomeridianum* (Kunth). Another species, *C. angustifolium* (Kellogg), is found near Mount Shasta. The root of the latter is not as long as that of the other variety, and is destitute of the fibrous texture which distinguishes the former.*

*Proceedings California Academy of Sciences, Vol. II., p. 106.

As we ascend, the rolling hills on the other side of the cañon look like beautifully clipped lawns, so evenly does the dense chaparral grow.

At the summit of the hill we find a neat and comfortable hotel—Priest's. From the porch a grand view is presented of the dark green, rolling foot-hills and the Sacramento Valley in the hazy distance. This is a pleasant place in which to spend the night, and at some seasons the stage makes Priest's the end of the day's journey.

Leaving this house—the Yosemite Hotel—we begin another ascent, not so long as Rattlesnake Hill, but in some places steeper. As we ride along, we see the remains of an old arastra. This was a Mexican contrivance for pulverizing quartz ore. A circular bed of stone from eight to twenty feet in diameter was laid down, sometimes of unhewn flat stones imbedded in clay, and again made of carefully dressed blocks set in cement. A short distance outside the circumference of the bed two stout posts, about ten feet high, were set in the ground on a line with the centre of the circular area, one post being on either side of it. From the centre of the rock-bed a post extends to a timber, the ends of which are securely fastened to the uprights just outside of the circular bed. The centre timber revolves on a pivot at the top and bottom. Fastened to this, a short distance above the lower end, is a long beam, to one extremity of which a horse or mule is hitched. At the other end a large flat stone, frequently weighing four or five hundred pounds, is attached by a chain in such a manner that the forward end is raised a few

inches above the bed, while the other drags along over the flat stones, thus crushing whatever may be beneath it. The Mexican breaks the rock into comparatively small pieces, and throws them in the way of the flat stone on the revolving beam. A new style of quartz mill has been recently invented, which works on the principle of the arastra. It is claimed for this addition to mining machinery that it can be constructed for much less money than an ordinary stamp mill, and also that there being no wear from incessant jarring, the machine will last much longer.

A mile beyond Priest's we come to Big Oak Flat. This was formerly also a rich mining region. The place took its name from an immense oak—supposed to be the largest in California—about thirty-six feet in circumference. Rich earth surrounded this large tree, and the miners did not hesitate to dig close to the great roots and even to cut these off when in their way. The branches were afterward sawed off. On the first of January, 1872, the dead trunk was blown over during a severe gale. Big Oak Flat was formerly quite a large town. The tourist may see in some of the hotels along the route lithographs of the settlement in the days of its glory. As in many other mining towns fire has destroyed the greater part of the place, and business has not warranted reconstruction. A little south of Big Oak Flat a large quartz vein passes through the county, cutting at a small angle the strata of slate in which it is contained. This vein differs essentially in dip and strike from the inclosing rocks, and will, therefore, interest the geologist.

Two miles beyond, is First Garrote, the second town of this name being still two miles farther along the road. At Garrote there is an excellent hotel. Few country hotels are as well kept. The fruit and vegetables of the vicinity are among the finest in the State. Rich quartz mines are worked near by, and the tourist will see many fine mineralogical specimens obtained therefrom.

In cages we see some of the Mountain Quails of California. These are among the most beautiful birds in the State. This bird, also called the Plumed Partridge, is common in the high mountain ranges of California and Oregon. It is not, however, found in the vicinity of San Francisco, nor is it certainly known to exist in the Coast Ranges south of that city.* Neither is it thought to live north of the Columbia River. In summer these quails abound in the Sierra Nevada to an elevation of 7,000 feet, and in winter are known to descend to lower altitudes. Their color is ashy-gray, with patches of reddish-chestnut on the throat and breast, and strips of the same color on the sides of the body. The body is stout, the bill large, the tail short and broad. On the head is a crest of two straight feathers, about three inches long turned backwards. The habits of the bird are similar to those of other quails, but their cries are different. A rather faint chirp is their note of alarm. When disturbed they disperse in all directions, and afterward call each other together by a whistle much like that of a man calling his dog. There are seldom more than fifteen or twenty birds in a flock. They find

*Geological Survey of California. Ornithology, Vol. I., pp. 545-547.

hiding places in the dense chaparral, and come out into roads and openings to feed in the early morning.

The reader feels a natural desire to know how this town received its name. The act of garroting is usually performed by three highwaymen, the victim being seized by the throat from behind, strangled and robbed. In early days, this region was infested with foot-pads and many travelers were garroted. Fom the frequency of these occurrences the two towns derived their name. Unsuccessful efforts have been made to alter the lugubrious appellation.

The topographical nomenclature of California is interesting. Localities have at different times received various names, some of which, if we may be allowed to use the expression, have "stuck"; others have been changed. Placerville was formerly called "Hangtown," from the large number of disreputable persons hanged on the trees near the early settlement. We may divide the names of places into four classes: First, those given by the Indians, comparatively few of which are retained; second, the names selected by the Missionary Fathers and their followers (especially the names of towns in Southern California), which usually are found in the calendars of saints; the third class includes the names given by miners during a few years after the discovery of gold and, in occasional instances, at a later date; last, are the names bestowed upon places recently built up, and which may be styled modern names. A few examples of these will close this digression:

Indian Names.—Klamath, from a tribe of that name; Ukiah, from an Indian tribe called Ukiahs; Napa,

from a tribe in the valley of that name called Napas; Carquinez, the Karquines* formerly lived on this strait; Shasta, from a tribe of that name; Cosumnes, from an Indian tribe inhabiting the Sacramento Valley called Cosumne; Suisun, Colusa, Yuba, Sonoma, Tulare, and Petaluma, are also Indian names.

Spanish Names.†—San Felipe, St. Philip; San Lorenzo, St. Lawrence; San Buenaventura, St. Good Fortune; Santa Cruz, the Holy Cross; San Juan Bautista, St. John the Baptist; Hornitos, Little Ovens; Buena Vista, Good View; Del Norte, of the North; El Dorado, the Golden Land; Placer, Gold Diggings; Contra Costa, Opposite Coast (*i. e.*, from San Francisco); Monte Diablo, the Devil's Mountain.

Miner's Names.‡—Nary Red, Hungry Camp, Slap Jack Bar, Last Chance, Quail Hill, Brandy Gulch, Seven-By-Nine Valley, Poker Flat, Mud Springs, Happy Valley, Dead Mule Cañon, Shin Bone Peak, Rough and Ready, Red Dog, Rat Trap Slide, Sonora, Dutch Flat, Greasers' Camp, Nigger Hill, Mormon Island, Paint Pot Diggings, Rag Town, Chinese Camp, One Eye, Paradise, Fiddle Town, Mosquito Gulch, Dry Town, Rich Gulch, Poverty Bar, Piety Hill, Git-Up-and-Git, Skinflint, Petticoat Slide, French Gulch, Bogus Thunder, Dog Town, Shirt Tail Cañon, Spunk Town.

Modern Names.—Mostly those of towns along the lines of the railroads, as Lathrop, Colfax, Niles, Stockton, Milbrae.

---

*Native Races of the Pacific States, H. H. Bancroft, Vol. I., p. 363.

†The author is indebled for the interpretation of these Spanish names to Resources of California, J. S Hittell, S. F., 1874.

‡The origin of many of these names is very uncertain, and the history of those that are known is too voluminous for our space.

From Garrote the remainder of the ride to the Yosemite Valley is through a different class of country. We soon leave the mineral belt, and continuing onward over the rolling hills find ourselves in the timber region.

At Second Garrote, two miles beyond our last stopping place, we see where quite a considerable town has been reduced to two or three houses.

Five miles farther on is Sprague's Ranch. This is the type of many farms of the Sierras. A small fertile valley encompassed by pine-clad hills is "taken-up" by a settler, a house is built, and the rich alluvial soil is cultivated. An abundant yield repays the hardy pioneer.

We now enter upon the finest portion of our ride. A constant rise is before us, and as the stage winds up the grade a great number of grand views present themselves. We have, a little way back, crossed the Gold Rock Canal, one of the large ditches of the region, and a short distance beyond Sprague's Ranch we see where a high flume, formerly used to conduct this water across a deep ravine, was destroyed several years ago. A few miles beyond we traverse a well-graded road along a steep mountain side. In the gorge, about two thousand feet below us, the South Fork of the Tuolumne River dashes over its rocky bed. In the distance a white speck against the dark green hill-side is a waterfall about one hundred feet high.

Sixteen miles from Sprague's Ranch is Hodgden's, where dinner is taken and where tourists sometimes spend the night.

From Hodgden's, the remaining thirteen miles of our journey continue to be all up-hill. Riding among the dense forests of sugar pines, yellow pines, Douglass firs, and cedars, one cannot fail to be impressed. The undergrowth found in some parts of the State is wanting here, and we look along the hill-side through grand tree vistas that seem to have no end. The side-hills appear admirably adapted to the growth of these noble trees, as by their arrangement each individual tree receives a goodly portion of sunshine.

> "Side by side their ranks they form
> To wave on high their plumes of green,
> And fight their battles with the storm."

While riding among these lordly pines, before suspecting their presence, we find ourselves surrounded by a group of about thirty-five *Sequoias*. This is the Tuolumne South Grove.

We pass on through grand forests, admiring the symmetry and dimensions of the individual trees. We have at last attained an elevation of 7,000 feet, and are riding over a comparatively level section where the forest is less dense. Immense granite boulders lie on the surface of the ground either alone or in great masses. We cross a foaming torrent that not far away leaps over a succession of rocky ledges to the river below. We are nearing the brink of the Yosemite Valley.

As we wind down the road from Gentry's—one corner of the Yosemite Grant—to a point near the foot of El Capitan, many grand views present themselves, notwithstanding that all the more noted points of in-

terest are hidden behind the rocky portals of the Valley.

Our space will allow only a brief mention of the other routes to the Yosemite. We have been particular in describing one of the roads, as it was possible by so doing to incorporate more information regarding the section of the country traversed, which for a considerable area differs only in the less important details, than could otherwise have conveniently been done.

By either the Mariposa or Coulterville routes the town of Merced (137 miles distant from San Francisco, on the line of the Central Pacific Railroad,) is made the railroad terminus. The tourist remains here over night and continues the journey by stage.

We will first describe the "Coulterville Route." The greater portion of the first day's stage ride is over the San Joaquin Valley and the chaparral covered foot-hills. The scenery along the road during the journey of the second day is more varied and interesting. By this route we pass through Coulterville, which, like Big Oak Flat, six miles north, is in a mining district. Extensive outcrops of quartz are seen near the town, while two miles north one of these forms is quite noted, on account of its striking appearance. This is Piñon Blanco (White Rock), a large mass of white quartz surmounting one of the chaparral covered hills of the region. We spend the night at Dudley's Mill, a short distance beyond Coulterville.

The chief objects of interest during the second day's stage ride are a fine grove of *Sequoias*, through

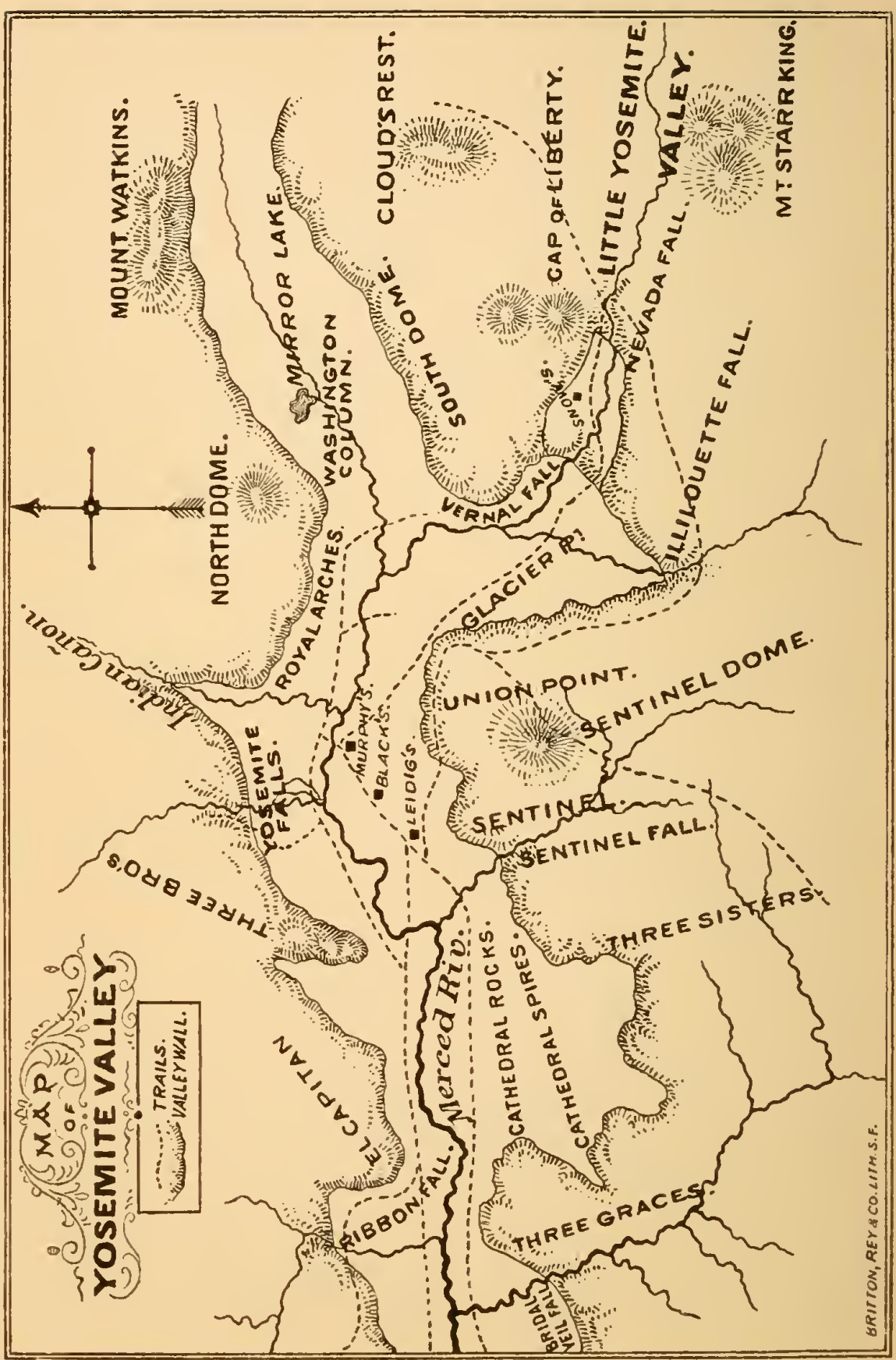
which the road passes, and Bower Cave. The latter is a cleft in the limestone, about 133 feet long, 86 feet wide, and 109 feet from the crest of the overhanging roof to the surface of a small lake, which fills its lowest drifts. A fine opportunity is afforded for the study of the formation at the same time one is resting in the cool recess.

By this route the Yosemite is entered through the steep rocky cañon of the Merced. The scenery along this portion of the journey is particularly pleasing.

The "Mariposa Route" traverses much the same kind of country as does the one just mentioned. The chief point of interest near this road, which is the most southern of all to the Yosemite, is the Mariposa Grove of Mammoth Trees. This grove was granted to the State of California at the same time as the Yosemite Valley, and is under the charge of the same Board of Commissioners. The grove is situated about six miles from the main road, and is reached by trail from Clark's. It is unfortunate that there is no hotel at the grove for the accommodation of travelers.

From Clark's a trail formerly led over the mountains and entered the Valley by way of Inspiration Point; the wagon road, although following much the same route, enters the Yosemite nearer the river and below the point where the visitor formerly came in sight of the Yosemite. This route passes through a region rich in grand views, and possesses many strong points which should not be overlooked while making a selection. We would reiterate the advice, visit the Valley by one road and return by another.

It may not be amiss to close this chapter with a few facts relating to the county in which we are now tarrying. Mariposa extends from the summit of the Sierra Nevada Range to the San Joaquin Valley. The divide between the Tuolumne and Merced Rivers forms its northern boundary. Fresno County lies on the south-east and Merced on the south-west. The length of the county is about 65 miles, and its width 30. The area is 1,884 square miles. The western portion of the county consists of low rolling hills, covered with chemisal, with here and there an oak-dotted dell. Farther east the elevations become greater, and at an altitude of about 3,000 feet moist and fertile valleys are found. Still farther east the county enters the heavy timber section of the Sierra Nevada. The Merced River is the only permanent stream in the county. Mariposa possesses but few large ditches, and placer mining has, therefore, not been extensively engaged in. Very rich deposits were worked by "dry washing," and where nuggets abounded the gravel was scratched over with knives. The great place of interest in this county is the Yosemite Valley.


MAP OF YOSEMITE VALLEY
TRAILS.
VALLEY WALL.
MOUNT WATKINS.
MIRROR LAKE.
WASHINGTON COLUMN.
CLOUD'S REST.
SOUTH DOME.
CAP of LIBERTY.
LITTLE YOSEMITE VALLEY.
M.T STARR KING.
NEVADA FALL.
ILLILOUETTE FALL.
NORTH DOME.
VERNAL FALL.
SNOW'S.
GLACIER Pt.
Indian Cañon.
ROYAL ARCHES.
MURPHY'S.
BLACK'S.
LEIDIG'S.
UNION POINT.
SENTINEL DOME.
YOSEMITE FALLS.
SENTINEL.
SENTINEL FALL.
THREE BRO'S
THREE SISTERS.
CAPITAN
Merced Riv.
CATHEDRAL ROCKS.
CATHEDRAL SPIRES.
RIBBON FALL.
THREE GRACES.
BRIDAL VEIL FALL.
BRITTON, REY & CO. LITH. S.F.

CHAPTER XII.

THE YOSEMITE VALLEY.

THE Mecca of our pilgrimage has been reached. The Yosemite Valley with its myriad charms lies before us. We hesitate as we contemplate the task of attempting to portray its grandeur or its beauty. There is a something there beside the towering cliffs and impetuous mountain torrents eagerly leaping from dizzy heights; there is yet more than the wandering river, mutely creeping beneath o'er-arching boughs, or noisily hurrying over massive boulders; there is a something beyond the quiet beauty of Mirror Lake, in whose reflecting depths the Morning Light depicts the forms of mountain peaks that cluster near; there is a subtle, mysterious, indescribable feeling of awe, native to the spot, which fascinates the lover of Nature. The cares of the world of business fade away, and one seems transported to a grander sphere.

Only those who have viewed face to face the noble forms in this Valley, and in their stately presence felt the deep emotions of a thoughtful mind, can fully appreciate the difficulty of imparting by mere words even a faint idea of the scenery. We can, at best, but lightly shadow forth the outline of an imperfect skeleton, leaving each individual imagination

to round out its living lines of complete fullness and quicken it into the true "eloquence of beauty" which Nature possesses.

The Yosemite Valley is a narrow gorge, about six miles long, and varies from half a mile to a mile in width. The floor of the Valley is an almost level stretch of meadow, 4,060 feet above the sea, and sunk nearly a mile below the summits of the surrounding mountains. This Valley, distant one hundred and fifty miles nearly due east from San Francisco, is about mid-way of the State, north and south, and near the axis of the Sierra Nevada Range. The Yosemite is not a mere trough cut through the granite mountains, for, although it retains that general appearance and lies nearly at right angles with the axis of the range, a reference to the accompanying map will show that a great number of square recesses and re-entering angles heighten the beauty of its walls.

The rock mass El Capitan, standing out boldly from the northern wall, and the jutting cliff of the Three Graces opposite, form a grand portal to the Valley proper. Only two of the most noted attractions are found without this rocky gateway—Inspiration Point and the Bridal Veil Fall. By no means are either of these or other less noted features to be passed as unworthy of attention. They, in a small degree, prepare us for the grander scenery within the almost perpendicular door-posts.

As we enter the Valley the first permanent fall which attracts our notice is Pohono, or, as more generally known, the Bridal Veil. One of the charms

of this interesting cataract is an Indian legend. In the Yosemite, but one object of note—the Yosemite Fall—retains the title bestowed by the former inhabitants. A few cling to the Indian names, but the many know only the more recent terms. The poetic legends of the Valley have been mostly forgotten with the departure of those who had for every rock a story. We fondly cling to the few mystic tales that relate to some leading points of interest. The Indians tell of one of their women, who, gathering berries by the creek above this fall, slipped into the hurrying torrent, was swept over the brink, and seen no more. They dare not sleep near the cataract, and in passing quicken their pace, for, in their superstitious dread, they hear the lost maiden ever warning them, with plaintive wail, to beware of Pohono—the Spirit of the Evil Wind.

The ledge from which the water leaps is 900 feet above the Valley floor, but, owing to the mass of *débris* at the base of the cliff, only 630 feet are perpendicular fall, the remaining height being completed by a series of cascades, which from some locations are entirely hidden by surrounding trees. Like all the falls in the region, this one, in a great measure, depends for its volume on the snow in the immediate vicinity. A few weeks suffice to greatly change its appearance. When the water is abundant it is precipitated in a bold curve over the crown of the cliff, but by the middle of July a mere thread, as it were, trickles down the wall. When the stream is of medium volume its picturesque effect is finest. As it leaps over the wall, the water is caught by the

strong wind and drifted in folds of spray to the moss-covered rocks below; and when the afternoon sun sinks behind the opposite cliffs, myriad rainbows dance among the mist.

In early spring, the snow, which during the winter has accumulated on ledges, cliffs and domes around the Valley, melts and trickles over the granite walls, in some places as a single slender thread, and at others forming a consecutive series of minor falls. A day or even an hour sometimes is the time of duration of these transitory cascades, while all of them entirely disappear in a few weeks after the snow begins to thaw. Thus, when with deafening roar the larger streams are pouring their swollen torrents over the cliffs, the entire rocky wall is, in places, pencilled with a maze of less noisy rills. These form a liquid lace-work, hanging, as it were, over the precipitous cliffs and gently swayed by the restless breeze.

Once passed within the eastern division of the Valley, the walls become generally higher and more irregular, while a smaller quantity of *débris* lies at the foot of the cliffs. From this more interesting portion two cañons penetrate the mountain fastnesses beyond. One of these passes between the South Dome and Washington Column, divides Cloud's Rest from Mount Watkins, and forming the cañon of the Tenaya Creek looses itself among the spurs of Mount Hoffmann.

The other is less steep and much shorter, being merely a recess in the south wall of the Valley, which terminates at a nearly perpendicular cliff, over one

part of which the Illilouette, or South Fork of the Merced, pours the waters from the eastern slope of Buena Vista Peak, while at another point the Nevada and Vernal Falls on the Merced River are situated. The Merced conveys the water from the eastern slopes of Mount Starr King and Mount Clark, the western flank of the range of high mountains that extend from Cathedral Peak, south-east to Mount Lyell and the northern side of the elevated ridge stretching thence to the Mount Clark group.

Back and to the left of the Bridal Veil is a group of rocks that resemble partly demolished sugar loaves. These are the Three Graces, a picturesque portion of the Valley's southern door-post. Back of these, and visible only after the upper portion of the Valley has been entered, are the Cathedral Rocks, which constitute the eastern side of this impressive granite mass. These rocks present the finest appearance when seen from about the middle of the Valley. The principal mass stands out from the valley-wall, showing two nearly perpendicular faces, which meeting almost at right angles attain a height of 2,660 feet. The upper portion closely resembles the ruined towers of some medieval church. On the summit, as well as in the crevices where a little earth has accumulated, stately pines are growing, which from the plain seem but a few inches in height. Comparatively little *talus* is found at the base of the cliffs, and except when the observer is on the spot, this is entirely concealed by a fine growth of trees that skirt the river.

To the east of this interesting rock-mass is a steep defile filled with huge blocks of fractured granite. Here, as in all similar localities in the Yosemite, and as along most of the mountain ledges, at every point where they can find nourishment, trees are growing. It is these verdure-clothed ledges which, in a measure, hide the jagged lines of mountain fracture, and beautify the stern gray walls.

Each mountain, dome, fall and rock-mass presents an almost entirely different appearance from variant points of view. Gladly, therefore, does the enthusiastic lover of scenery avail himself of each opportunity to follow some unfrequented defile over masses of broken granite to an unvisited ledge on the mountain wall whence new beauties in the ever-changing landscape repay his exertion. Pleasing is it ever to watch the contest of lights and shadows as they battle along the cliffs, pursuing each other up and down the walls, around every crag and behind each towering pinnacle.

At the east of the Cathedral Rocks, where the valley-wall recedes, we see, among a group of pointed peaks, two that have, from their especial formation, been styled the Cathedral Spires. There were formerly three of these, but, a few years since, the most easterly one was thrown down by an earthquake. The slope at its base was covered with tons of shattered granite, while the whole region felt the force of its fall. The place where it formerly stood is plainly seen from the floor of the Valley.

The Indians named these spires *Posinaschucka*, a term interpreted to mean a large cache-basket, which

the rocks greatly resemble. The Indians store their food—in this section mostly acorns—in large baskets sometimes in trees and often on poles stuck in the ground, while over the basket they build a thatch of pine branches.

We have extendedly dwelt upon the features of the southern gate-post of the Valley, in order to give them a prominence commensurate with their attractions, because they are usually slighted by the visitor when first entering the Yosemite. The stupendous granite mountain on the opposite wall generally so moves the beholder that, howsoever interesting neighboring objects may be, all sink to insignificence before the towering majesty of El Capitan.

El Capitain is a solid mountain of granite, standing boldly forth from the northern rim of the Yosemite Valley. Like Cathedral Rock, little *débris* is at its base, and its almost vertical sides* meeting form a well-defined angle.

One who has not seen this mass can have but a faint idea of its immensity. Riding through the Valley and looking up at the dwarfed trees on the crest of El Capitan, mere specks against the transparent blue of the sky beyond, or from that summit looking down into the narrow valley, one cannot be unmoved. Other peaks attain much greater altitudes, but seldom is a person more impressed with the feeling of magnitude. As, in our dwarfed understanding, we cannot conceive the immensity of space or eternity, neither do we form an idea of the massive-

*Although the face of El Capitan appears nearly vertical, it is far from it, as the base stands 1,200 feet in advance of the brow.

ness of those granite mountains until we see the section of one exposed from crown to base.

The face of this rock is 3,300 feet in height. In New York the spire of Trinity Church is looked upon as almost piercing the clouds, yet it would require twelve such spires placed on the top of each other to equal in height El Capitan. The extremity of the cross on St. Peter's, at Rome, is 448 feet above the pavement. El Capitan is nearly eight times as high. The spire of that masterpiece of Gothic architecture—Strasburg Cathedral—is 468 feet high, and still the compound height of seven such structures would not equal the height of this rock mass. If a line of men of ordinary height were standing in the Valley, with another row standing on their shoulders, and on their shoulders another line, before the last man could reach the summit of El Capitan, there would be more than 1,300 men in the group.

The Indian name for this mountain is *Totokónula* (usually spelt Tutocanula). Several interpretations of its origin have been suggested, one of which is that the word was thought by the aboriginies to resemble in sound the cry of the sand-hill cranes that sometimes, flying over this mountain, enter the Valley. Still another rendering is that a fancied image on the mountain wall has long limbs, and in that respect resembles a crane.

Riding up the Valley, the next chief object of interest, on the northern side, after passing El Capitan, is a granite mass which, shelving backward, appears from the plain to form a series of three steps, tilted considerably to the right. These bear a faint resem-

blance, especially the middle one, to frogs about to jump; hence, they may have derived their name, Leaping Frog Rocks. Another interpretation is that they somewhat resemble boys in the act of playing leap-frog, and that their designation should be, "Mountains Playing Leap-Frog," but this is a questionable rendering. The Indian term, which is claimed to admit either of these translations, is *Pompompasus*. Perhaps a more authentic appellative is *Wawhawke*, or "Falling Rocks." They are, however, commonly known as the Three Brothers, and form a very impressive group. The highest peak, sometimes called Eagle Point, is 3,830 feet above the Valley. The back of the group is a nearly perpendicular wall, broken by occasional ledges on which grow clumps of trees.

On the southern wall, and almost opposite the Three Brothers, stands the Sentinel, or, as sometimes called, Sentinel Rock. The latter name is applied to distinguish it from one of the round-topped mountains of the region, which stands behind it, and is styled Sentinel Dome. The Sentinel is an interesting feature, and attracts attention as well by its form as by its dimensions. It is shaped much like an obelisk, the face of the upper portion being nearly vertical. The apex is 3,043 feet above the Valley, and 1,000 feet above the southern wall of which it forms a part. A considerable amount of *talus* lies at its foot. We can see where large blocks of granite have been loosened from the cliffs by the action of the elements. The rock is frequently so fractured that the whole looks like an immense structure of

brickwork. When such a mass is severed from the wall and slides to the valley, it breaks into a multitude of smaller pieces, which pour down over the cliffs in regular channels. Many such may be seen in the vicinity, being easily traced by the worn cliffs as well as the pulverized granite, which, remaining on the ledges, attracts attention by the glare of its whitish color. At the foot of the Sentinel the soil is very sandy. This sand is coarse, and consists of disintegrated granite. Growing on the soil we notice the bastard cedar (*Libocedrus decurrens*), the yellow pine (*Pinus ponderosa*), and the black oak (*Quercus Sonomensis*). The large acorns of the latter are the chief food of the Indians. Of less stately representatives of the plant world, we find the common brake (*Pteris aquilina*), the *Pentstemon lætus*, which never fails to attract attention by its beautiful blue flowers, and another plant, both pretty and interesting, the *Spraguea umbellata*. The *débris* at the base of the cliff is covered with a compact growth of evergreen-oaks, maples, laurels, and manzanitas. Along the ledges above the *débris*, pines are growing. The three principal hotels are near the base of the Sentinel. It affords one much pleasure to watch the effects of lights and shadows on the face of this obelisk, especially when the large fleecy clouds, sometimes seen, slowly float overhead. The Indians call this rock *Loya*, a word supposed by some to mean "camp-fire" or "signal-station," and it is thought that they may have used the summit for an outlook, as it commands a great area of country. Mr. Hutchings says *Loya* means a medicinal shrub. This shows the difficulty

of arriving at the real meaning of Indian names at the Yosemite.

On the right side of this interesting rock-mass is the Sentinel Fall, which consists of a series of beautiful cascades and cataracts. The stream that pours over the rocks here is one that flows but a short time in the spring. We have omitted another similar fall, just west of El Capitan—the Virgin's Tears—which is directly opposite the Bridal Veil. During the brief period of its existence the water-fall presents one of the most beautiful objects in the Valley. It is more than a thousand feet high, and is situated in a deep recess in the northern wall.

To the left of the Sentinel, on the Valley rim, we notice a peculiar rock, resembling a boulder, which, standing on the brink of the precipice, appears ready to fall at any instant; nevertheless, it has held its giddy post for ages, and appears no less secure than it may have been a century ago. This curious rock has been named Agassiz Column.

We are now in the most interesting portion of the Valley, many of the leading points of interest are in the immediate vicinity, while on all sides hundreds of objects excite the curiosity of the visitor and the ever changing aspects of the scenery surfeit his love for the grand and beautiful.

It is in this section that the greater portion of meadow-land is situated. The soil is of a peaty nature, and sustains a rank growth of vegetation. In the spring the Merced is so swollen that the main channel proves insufficient to carry the increased amount of water, which, backing up, overflows this

meadow. When the water subsides, in the quiet pools we see beautiful reflections. These mirror-views are a constant source of delight. Not only are the grander outlines of the mountains reproduced, but every crag, ledge and line of fracture, every shade and shadow, each tree, flower and blade of grass—all are faithfully photographed. Another feature of these meadows are the mounds of fertile earth which are covered with a dense growth of pink columbines, and larkspurs of various shades of blue, varying from indigo to a delicate bluish-white. Together with these are large brakes and a pretty native lily, which we will describe. This is the *Lilium parvum* of Kellogg. It usually grows to a height of eighteen inches, but is in these favored localities much taller. The leading characteristics of the plant are partially erect flowers and scattered leaves. The flowers, which are abundant, are small and bell-shaped. These plants resemble tiger lilies in the marking on the petals.

The Merced, or, as the Spanish settlers called this stream, *el Rio de los Merced*—the River of Mercy—is noted in this locality for the many picturesque groves by its banks. The river flows over a sandy bed, and winds through the meadow in a series of broad curves. The stream is as clear as crystal, and one can easily see the fish quickly gliding from one deep pool to another. This water, like all the Sierra streams, is icy cold, for it should be remembered that it is but a few hours since the genial sun wakened it to life on the granite slopes of the higher peaks. The Balm of Gilead poplar (*Populus balsamifera*)

grows abundantly along its banks in this part of the Valley. Indeed, the clumps of trees add manifold charms to the stream. These sequestered regions of the Merced are ever adorned with a varying beauty. A wild, impetuous torrent appears to have become exhausted in leaping from one boulder to another, and placidly glides into the rest that an almost level course permits, before it is again lashed to foam in the rapids at the western end of the Valley. Flowing through the meadows, the surface of the river is unruffled, save by occasional eddies where it hurries around some jutting point, or by ripples when it glides over sandy bars. As he writes, the author has before him one of Mr. J. J. Reilly's beautiful photographs, bearing the title "Day Dawn in the Yosemite Valley." This is a view on the Merced. The foreground is filled by a large bend in the stream, which issues from behind a clump of trees. Its right hand foreground is flecked with fleecy foam, but near the outer bank a rippling tide reflects the sun's warm rays with silvery sheen. The North and South Domes form the background. Their steeply sloping cliffs are obscured in deepest shade, while fragmentary clouds, floating overhead, wrap this part of the picture in additional gloom.

All of the hotels, except Snow's, are near the south bank of the river in this part of the Valley. The visitor may thence make many pleasing short excursions, while from the porches of the houses a majority of the leading objects of interest are in sight. From the verandas the chief attraction is the Yosemite Fall. This is not one unbroken descent, but

consists of a perpendicular plunge of 1,500 feet, a series of minor cataracts aggregating a vertical height of 626 feet, and a final fall of about 400 feet. These falls are in almost the same vertical plane, so that the whole is quite as effective, and perhaps more picturesque, than would be the case were the total depth accomplished in one plunge. The first descent is made over an almost vertical wall. The rim of the cliff is slightly concave, the most remote portion being that over which the water is poured. The most easterly extremity of this precipice rises to a height of 3,030 feet above the Valley. The water pours through a deeply cut channel and over the lip of the highest fall, and about a hundred feet below strikes on a projecting ledge from which it shoots out in a fine curve. From rough points on this ledge sprays of water are shot into the air in the shape of cones, and in descending so nearly resemble rockets as to warrant this appellation. Many of these "rockets" continue in this form until they strike the rocks below. The wind exercises a potent influence on this long, slender fall, almost always swaying it from side to side, and occasionally carrying it so far from the line of perpendicular descent that, for a few seconds, no water falls into the basin, but is all dashed against the cliff and seeks the Valley through unusual channels.

The upper fall strikes on a sloping ledge that, from the Valley, seems very narrow. This, however, is about a third of a mile wide. The creek traverses this bench in a deeply worn channel, in which several fine cataracts cut their grooves. Some of them

may be seen from different localities, but from most points these cascades are completely hidden.

The lower fall is scarcely affected by the currents of air. When the water is abundant, it is thrown over the rim of the cliff in a large curve, and strikes on huge blocks of granite with sullen roar. As the stream diminishes, and scarcely more than spray reaches the large granite basin at the foot of the upper fall, the water runs over the steeply-sloping face of the lower precipice until it strikes a sloping ledge, which carries it considerably to the left. At the base of the lowest fall the creek divides into several channels, which ultimately form one stream. A good trail leads to the foot of the upper fall, and the fine views obtained while making the ascent amply pay for the time and effort expended. It is to be hoped that at no distant day this trail may be continued to the top of the cliff over which the upper fall leaps.

East of the Yosemite Fall is a steep defile, called Indian Cañon. This ravine is filled with *débris* to a great height, many pieces of the granite being more than ten feet square. A trail formerly led over these fragments. This has been in places destroyed, so that the excursion can, at present, be made only on foot. This trail should be repaired. When that is done, the one previously mentioned continued, and the Yosemite Creek bridged above the fall, this part of the Valley will be more frequently visited and appreciated.

The Yosemite Creek rises on the western slope of Mount Hoffmann, ten miles distant, in a north-easterly course from the Valley. The stream, which is

supplied by the melting snows on the mountain side, follows the bed of an ancient glacier. At many points one can see where the granite has been polished by slowly moving ice. The bed of the creek above the fall is a narrow granite valley, with steeply-sloping sides. At many points along this valley we see immense boulders that have been brought from the mountains beyond by the ice river. Late in the year one may follow the bed of the Yosemite Creek nearly to the lip of the upper fall. The rocks are very smooth and the verge of the cliff so curved that we cannot safely approach it. As we stand in that rocky gateway, how grand is the view of the Valley below, dotted with miniature trees—how impressive the face of the Sentinel opposite, and how beautiful is the coloring on the cliffs down the Valley, where they are painted by the rays of the fast declining sun!

Just east of Indian Cañon, and towering above the Valley wall, of which its base forms a part, stands the North Dome. The summit may be reached by way of that defile, and the grand views disclosed, as well as the opportunity of studying the rock structure of the region, amply repay the fatiguing climb. The Indians call this mountain *Tokoya*, a word which is translated to mean "the basket."* Mr. S. M. Cunningham kindly acted as interpreter for the author, his familiarity with the Indian language affording an opportunity of obtaining much information relating to the legendary lore of this rapidly disappearing tribe. On one occasion the Chief stated that *Tokoya* means in his language, a "pap," and, because of its

*Yosemite Guide Book, J. D. Whitney, Pocket Edition of 1874, p. 22.

close resemblance to the female breast, the dome-shaped mountain received its name.

A portion of the Valley side of the base to the North Dome has been removed, thus exposing its structure. From the face of this almost perpendicular cliff large blocks of granite have slid down, leaving arches formed by the convex shells that compose the mountain. These fine arcs attract much attention, and have received the name Royal Arches. The Indians call them *Sohokoni*, a word meaning the wicker-work shade over the top of the baskets in which their children are carried. When the snow melts along the cliffs, tiny rills trickle over this wall, and follow the ledges, keeping alive brilliant bands of purple lichens* that add much to the picturesque effect of the bare granite. This cliff terminates abruptly where the Tenaya Cañon begins. Washington Column, a singular tower-like mass of striking appearance, stands at the end of the northern wall of the Valley.

The grand feature of this section is the South, or, as sometimes called, the Half Dome. This impressive land-mark which is seen from almost all the elevated points of view is hidden by nearer cliffs as we ride through the door-posts to the Yosemite, and not until the visitor gains the meadows does it enter his range of vision. From nearly every different location this mountain presents a dissimilar appearance. Where its long steeply sloping base is seen, its height is apparently lessened, but when only the more ele-

*Mountaineering in the Sierra Nevada, Clarence King, Boston, 1874, p. 143.

vated portion is in view, its lordly summit towers in solitary majesty above every point in the Valley.* The crest is 4,737 feet above the meadow. The shape of the South Dome is such that but one party has ever succeeded in reaching the summit, an undertaking few will care to attempt, and a still smaller number can accomplish. The side that faces the North Dome is an absolutely perpendicular wall for 1,500 feet down from the apex. It then slopes at an angle of from 60° or 70°† to the bed of the cañon. This steep slope is not composed of *débris* as are many in the vicinity, but is solid granite. The opposite side consists of a sharp curve and a slope of perhaps 80°, which continues to the line where the mountain unites with the elevated granite wall. Though not as abrupt, the other parts of the mountain are scarcely less difficult of ascent.

The Indians have coupled with El Capitan and the South Dome one of their most pleasing legends. The former was the abode of the Semi-Deity of the Valley —*Totokónula*—who supplied their earthly wants. The South Dome was the habitation of a super-natural maiden, *Tesaiyac* (frequently spelt Tisayac.) Each mountain received the name of the being supposed to abide there. *Tesaiyac* is described as a sea-nymph from the south, endowed with wings, and partially enveloped in a floating cloud. Her fine golden hair hung in long wavelets. Her eyes of heavenly blue heightened the charm of a lovely face. *Totokónula*

*Cloud's Rest, back of the South Dome, seems to more properly belong to the High Sierra than the Yosemite, and is here, so regarded.

†Yosemite Guide Book, J. D. Whitney, Pocket Ed., 1874, p. 96.

became enamored of her beauty and followed her from crag to peak in vain pursuit. Without his care the inhabitants of the Valley were menanced with many dangers; the waters wasted away, the herbage withered, the leaves dropped from the oaks and the acorns ceased to grow. In their distress they vainly prayed to their infatuated guardian. *Tesaiyac* heard their cries and, repenting the evil she had caused them, disappeared from the South Dome forever. At that instant a severe earthquake was felt, and the South Dome was rent in twain, half of it disappeared, and the cooling waters from Lake *Tenaya*, which had previously emptied into the Tuolumne, filled the parched bed of the Merced, and refreshed the thirsty land. The song of babbling waters and the drooping willows' soft replies again were heard, the herbs revived, the oaks resumed their robes of green, the needed acorns reached a full fruition, and plenty filled the happy land. The night was approaching its noon, the cliffs were wrapped in darkness and the embers of the camp-fire were slowly dying away, as the old Indian added, that *Tesaiyac* lowered a cloud on which *Totokónula* mounted to the regions of the blest. The Indians aver that the little white violets, scattered through the meadow-lands, had their origin in the down from *Tesaiyac's* wings that the breeze wafted thither when the maiden departed.

Proceeding up the Tenaya Cañon—that branch of the Yosemite Valley which has its mouth between the North and South Domes—we reach a beautiful sheet of water, about two acres in extent, called

Mirror Lake. This is chiefly noted for the beautiful reflections it gives of the surrounding mountains. When its surface is unruffled, we see in the clear depths the inverted pictures of all the objects around. The most favorable time in the day for visiting this lake is before sunrise, which, owing to the high wall of the South Dome, does not, in June, take place, until nearly eight o'clock. The water is then usually placid and the reflections finest. As the rising sun peeps over the mountain wall, a bright fiery ball appears to gradually roll up through the water over the reflected cliff, and dazzles our eyes with its brilliancy. Presently the full reflected sun shines from the water, and in a few seconds later the original comes into full view. When a breeze comes down the cañon and hurries across the pool, "the polish'd mirror of the lake" is shattered. Standing by the mountain lake, admiring the varied foliage of the trees that deck its margin, we feel the deep emotions naturally evoked by the impressive scenes that surround us. Pleasant are the author's memories of nights spent here, when, rolled in comfortable blankets by a friendly log, he watched the sparks from a crackling camp-fire floating among the trees, and the dancing shadows playing beside the boulders. The full bright moon shed her cool light over the mountain peaks and the nestling lake, where

> "Every wave with dimpled face,
> That leap'd into the air,
> Had caught a star in its embrace,
> And held it trembling there."

It has been stated that the southern fork of the Yosemite Valley is merely a recess in the valley wall, which is separated from the Tenaya Cañon by the high bluff at the foot of the South Dome. A little more than a mile east of the Sentinel the cliffs, of which that forms a part, turn abruptly to the south, making almost a right angle. The summit of this bend is Glacier Point. It faces to the east and drops in a perpedicular wall, about half the distance to the meadow, terminating in a steep smooth slope. Numerous pinnacles surmount the mountain wall which faces the Yosemite Fall.

The Valley at the foot of these cliffs is level and dotted with clumps of trees, and in some places adorned with dense thickets of fragrant azaleas (*Azalea occidentalis*), which grow to the height of three or four feet.

Continuing along the trail through the southern arm of the Valley, the ground is strewn thick with granite fragments. We soon cross Illilouette Creek, sometimes called the South Fork of the Merced. A glance at the map will show the course of this stream. Passing from the elevated region to the south, the Illilouette flows through a V shaped valley until it reaches the southern wall of the Yosemite. It here makes a plunge of about six hundred feet, and then hurries over masses of boulders until it unites with the Merced. The tourist, who follows the trail from Glacier Point to the Little Yosemite, will see on the side of the cañon, through which the Illilouette flows, an immense furrow ploughed down the mountain slope. This was caused by a cloud burst.

The over-laden cloud struck the sharp crest and broke. The torrent grooved a wide, deep channel down the mountain side; trees, boulders and earth were hurried into the creek and onward over the fall, covering the Valley at its foot with tons of *débris*. Here a fine growth of conifers, so great was the shock of the raging waters, were overwhelmed.

The trip to the Illilouette Fall is toilsome and seldom undertaken, as no trail has been built thither. A fine view of the cataract is obtained from the Mirror Lake trail. The volume of water is about equal to that in the Yosemite Creek, and the height of the fall nearly the same as the lowest leap of that stream.

Soon after crossing the Illilouette we reach the base of the southern wall. Leaving our horses, and following a foot-path for a few hundred feet, we come in view of the Vernal Fall—the lower of the two main cataracts of the Merced. The path continues along the sloping mountain side to the foot of the cliff over which the water leaps, thence a series of ladders lead to the summit of the fall. This was formerly the only way of reaching the Nevada Fall, about a mile further up stream. The journey is now made by horse, a good trail having been cut along the Valley wall. As we ascend a multitude of commanding views present themselves. Reaching Snow's, near the foot of the Nevada Fall, we lunch and then leisurely survey the scene.

Let us first preface our remarks relating to the falls by a few words as to the river itself. The Merced gathers the melting snows from the semicircle of ele-

vated mountains, of which Cathedral Peak, Mount Lyell, and Mount Clark are the dominating points. Having its head in the region of perpetual snow, although suffering some diminution, in no season is the volume of water exhausted. The stream traverses the Little Yosemite, which at some points presents a striking counterpart to its better known namesake, and pours over the southern wall in two separate falls and a long series of rapids. The river accomplishes in the distance of two miles a perpendicular descent of 2,000 feet.* The two main falls aggregate a vertical height of 1,000 feet, and the beautiful rapids between them 300 feet more. The remaining 700 feet of descent is made by the stream before reaching the meadow land. The Merced at this part seems to be a river of foam, while from other points it resembles a rift of snow clogging the narrow gorge.

The Vernal, or lower fall of the Merced, differs widely from any in the vicinity, the dissimilarity of these cataracts being a characteristic of the region. Approaching the fall from below, whence it presents the finest appearance, if the water is abundant, we see a powerful stream swiftly pouring over a slightly concave wall. From a distance the fall seems a white ribbon stretched over the cliff. It is not easy to ascertain the height of this cataract, for, although the wall is vertical for a considerable distance from the top, its base is a steep slope. Prof. Whitney writes:† "Our measurements give all the way from 315 to 475

*Yosemite Guide Book, J. D. Whitney, Pocket Ed., 1874, p. 99.

†Yosemite Guide Book, J. D. Whitney, Pocket Ed., 1874, p. 99.

feet as the vertical height of the fall, between the months of June and October." He approximates its height in round numbers at 400 feet.

From Snow's we approach the fall from above. Leaning against a natural parapet on the face of the cliff, and looking over, we see the water striking the angular rocks, while clouds of spray deluge the lower slopes of the mountain, where a few pines are growing and the rocks covered with rank mosses and ferns. At some times the water, as it curves over the cliff, has a beautiful green tint, from which its name probably originated. The general appearance is that of a mass of diamonds set in frosted silver. The Indians call this fall *Peiwayak*, a name translated as "white water," "sparkling water," or "a shower of crystals." From the parapet the ladders before mentioned lead to a grotto in the mountain wall at the side of the fall. Along ledges of rock are numerous large and beautiful ferns (*Adiantum pedatum*). The botanist at Yosemite in June will find many additions worthy of his herbarium.

At the summit of the Vernal Fall the granite is generally smooth and slopes to the stream. The river between the two falls is a foaming torrent. About midway of this distance, and near where the bridge to Snow's crosses it, the stream rushes through a narrow crevice, its abrupt descent causing beautiful rapids, which are called the Diamond Race.

The Nevada Fall is in some respects the finest in the region. It carries a greater volume of water than any of its height in the neighborhood. The descent is not a perpendicular plunge, for part way down the

sparkling stream strikes a projecting ledge, which sends a portion back toward the lip of the fall. From this ledge the torrent seems to slide down the steep slope like a perpetual avalanche. At high water the blinding spray prevents an accurate measurement, while late in the year it is almost impossible to decide exactly where the fall terminates and the rapids begin. Prof. Whitney says:* "Our measurements made the Nevada Fall 591 to 639 feet at different times and seasons." He places the average height at 600 feet.

Snow's Hotel, on the rocky plateau between the Vernal and Nevada Falls, is a very comfortable hostelry, and the scenery will richly repay a few day's rest, even if the visitor's time be limited. From this place many delightful rambles may be had along the cliffs, as well as into the Little Yosemite.

The Cap of Liberty is a striking rock-mass, which stands alone. The summit, which is 2,000 feet above its base, may be reached by a tiresome climb from Snow's. The Cap of Liberty is scarcely less interesting than the South Dome. Whether seen from below the Vernal or Nevada Falls, its effect is much the same. When we stand at the base, and look up the almost perpendicular side, from which large fragments appear to have been chipped by some Titan's hammer, the immensity of this stupendous mass is thoroughly appreciated.

Our space permits only a few remarks about the Indians. Indeed, we fear this is a subject few tourists wish closely to investigate. Degraded as they

*Yosemite Guide Book, Pocket Ed., 1874, p. 101.

are, and filthy, too, yet it is not uninteresting to study the prehistoric traditions, origin, and manners of these wrecks of former powerful tribes, stranded on the shores of the nineteenth century.

The Yosemite Valley seems to have been the resort of outlaws from numerous tribes. The depredations of these outcasts proved the immediate cause of their overthrow as well as the discovery by the white man of their stronghold. The more powerful Monos, smarting under many grievances, at last dealt a blow that almost annihilated the tribe, scarcely more than a score remaining at the present day. These few have been partially civilized, but still live in rude huts, and, when they cannot beg their food, subsist on fish and acorn-flour. The process of making their bread is interesting. The acorns are gathered in large cone-shaped baskets, carried on the backs of squaws. The outer covering is broken off, and the lobes of the seed thrown into large baskets. These are carried to a flat rock in which natural or artificial hollows—about four inches in diameter—are found. The nuts are put into these holes and pulverized with round stones. The flour is taken to a spot near running water, where the soil is sandy. A hole, shaped like a saucer, about three feet in diameter, is scooped in the fine sand. The Indian women are very handy in making these sand-saucers, and the circle is scarcely less perfect than would be the case were it drawn with an instrument. The flour is placed in this basin of sand to the thickness of about an inch on sides and bottom. Water is poured over the flour, and, as it perculates through the sand,

seems to carry away the bitter principle of the acorn. When sufficiently prepared in this way, the squaw scoops out the dough with her hands and puts it into a basket about eighteen inches in diameter. The portion to which sand adheres is placed in another basket, and the sand washed away. During the time that these operations have been going on, a fire near by has heated a number of smooth stones of about two pounds weight. These are taken from the fire with long sticks and dropped into the basket full of thin acorn dough. The heat from the stones cooks the bread—which is about the consistency of mush. The stones are then taken out and the bread removed with the hands, and in the shape of large lumps is placed in the cold water near. This food tastes much like cornmeal gruel that is not seasoned. The baskets in which the cooking is done are water-tight.

A pleasing excursion is that to Inspiration Point, on the south wall, west of the Bridal Veil and near where the cliffs approach to form the Cañon of the Merced. The views obtained are grand, and the many opportunities for studying such points as we have noted in the beginning of this chapter will repay the visitor for the time consumed.

The finest trip of all is a ride along the southern wall from Glacier Point to Cloud's Rest. By this trail we ascend the *débris* at the base of the Sentinel and thence to Union Point, 2,300 feet above the Valley, from which eminence we can study that curious rock, Agassiz Column, now just below us. From Union Point we climb the steep mountain slope, covered with dense chaparral, and reach

Glacier Point. From no part of the Valley wall, so easy of access, can such extensive and varied views be obtained. The Vernal and Nevada Falls are seen below us to the right, while back of them in the distance towers Mount Clark. We next ascend Sentinel Dome, an altitude of 4,150 feet above the Valley. From this elevation the South Dome, towering 587 feet above the summit on which we stand, looms up in grander appearance than from any other locality. We here have a rare opportunity of studying the topography of the country, but the High Sierra to the east kindles eager longings for a trip among their fastnesses. From Sentinel Dome we ride near the south valley wall, crossing the Illilouette and Merced, and descending by a steep grade to Snow's. Thence the ride to the summit of Cloud's Rest consumes but a few hours, and the grand views of the high peaks of the California Alps form one of greatest attractions near the Yosemite.

We have thus briefly surveyed the charms of the Valley, but before leaving its mystic precincts let us review a few of its leading characteristics.

The Yosemite Valley consists of three portions. The first of these is a nearly level area, which is about four and a half miles long and extremely variable in width. It is only 35 feet higher at the mouth of the Tenaya Cañon than at the foot of the Bridal Veil Fall.

The second important section of the Valley is the piles of *débris* which line the base of the wall at all but a few points. Notwithstanding the large quantities of *talus* at their base, the height of this broken

mass shows but an inconsiderable altitude when compared to the walls themselves. The most *débris* is at the base of the cliff between the Sentinel and Glacier Point, while at the foot of El Capitan and the Yosemite Fall this ever-present feature of the landscape is scarcely noticed. While describing the Sentinel we have mention the leading trees on the *débris*. It should be observed that the vegetation is greatly affected by the physical features of the Valley, so that for the limited area the flora is very extensive.

We have described the salient features of the third portion of the Yosemite—the cliffs. These are nearly or quite vertical. Our space has permitted mention of only the leading points. When it is remembered that the narrow valley is entirely surrounded by precipices, varying from two to four thousand feet high, cut by a few steep and difficulty traversed defiles, the reader will understand how the Indians were able for so long a time to defy entrance and assault. The cliffs are a cold gray color, and present a dazzling appearance in a bright sunlight. Their chief charms of color lie in the contrasts between the rock, striped in places with bands of warmer color and the brilliant green of the vegetation along rocky ledges, or by the banks of the river that winds through the meadow.

Several theories as to the formation of the Yosemite have been advanced, and each has its partisans. It is not the province of this volume to enter into any such geological controversy, and we can only state that some urge that the Yosemite is but a

fissure formed by an earthquake; others claim that a part of the mountain chain has subsided; while still others assert that glacial-action only accounts for the formation of this curious valley. Each theory is, perhaps, correct in some features, but it is evident that ice has performed an important part.

Climbing along the walls is an arduous but instructive method of studying the chief points of interest. The ambitious tourist should remember, however, that when at the base of the cliffs he is about 4,000 feet above sea level, and that in reaching many of the coveted stations he doubles this height. Although these pedestrian excursions are enjoyable, they are not necessary. All the leading points of view are reached by trails that are well built and kept in good condition.

The length of the visit depends entirely with the tourist himself. A general idea of the Valley may be gained in three days; still, he should not so limit himself, for the excursions are attended with a certain amount of fatigue which materially interferes with the pleasures of the trip. The student of Nature will find abundant material to occupy him for weeks or months. The more prolonged the stay, the greater becomes the appreciation of enjoyment.

> "While nature's pulse shall beat the dirge of time,
> Thy domes shall stand—thy glorious waters chime.
> Farewell, Yosemite; thy falls and sunlit towers
> Will rise like visions on my future hours."

APPENDIX.

Various Routes to the Yosemite Valley, Distances, Time Schedules, and Points of Interest.

[NOTE.—For the assistance of those about to visit Yosemite, we append a list of the principal routes. In these estimates no time is allowed for stopping over, except at regular terminal stations. It is very difficult to arrive at the exact distances, as many are only approximated, and also on account of the fact that the stages often follow different roads, thus varying the distance. We number the roads simply as a matter of convenience, and not with regard to their respective merits, beginning with the most northerly one.]

FIRST ROUTE.

Via Calaveras Mammoth Trees.—Leave San Francisco at 4 P. M., by Central Pacific Railroad, and arrive at Stockton at 8:30 P. M.; distance, 91 miles. Stop over night at Stockton. Leave Stockton at 8 A. M., and arrive at Calaveras Mammoth Trees at 3 P. M.; distance, 74 miles (28 miles by Copperopolis Railroad, remainder by stage). Stop over night at Mammoth Trees. Leave Calaveras Mammoth Trees at 3 P. M., and arrive at Murphy's at 6 P. M.; distance, 16 miles.

Stop over night at Murphy's. Leave Murphy's at 6 A. M., and arrive at Priest's at 7 P. M.; distance, 37 miles. Stop over night at Priest's. Leave Priest's at 6 A. M., and arrive in Yosemite Valley at 4 P. M.; distance, 50 miles. Total distance, 268 miles. Actual traveling time, 37½ hours.

Attractions of this Route.—Mammoth Trees of Calaveras County (hotel at the Grove), South Grove of Big Trees, Mammoth Cave of Calaveras, Southern Gold Mines, Great Timber Belt of the Sierra Nevada, Tuolumne South Grove of Mammoth Trees, and countless grand views of mountain scenery.

SECOND ROUTE.

Via Big Oak Flat.—Leave San Francisco at 4 P. M., by Central Pacific Railroad, and arrive at Stockton at 8:30 P. M.; distance, 91 miles. Stop over night at Stockton. Leave Stockton at 8 A. M., and arrive at Priest's at 7 P. M.; distance, 67 miles (28 miles by Copperopolis Railroad, remainder by stage). Stop over night at Priest's. Leave Priest's at 6 A. M., and arrive in Yosemite Valley at 4 P. M.; distance, 50 miles. Total distance, 208 miles. Actual traveling time, 25½ hours.

Attractions of this Route.—Copper Mining Region at Copperopolis, Gold Mines near Big Oak Flat, Timber Belt of the Sierra Nevada, Tuolumne South Grove of Mammoth Trees, and fine scenery.

THIRD ROUTE.

Via Coulterville.—Leave San Francisco at 4 P. M., by Central Pacific Railroad, and arrive at Lathrop at

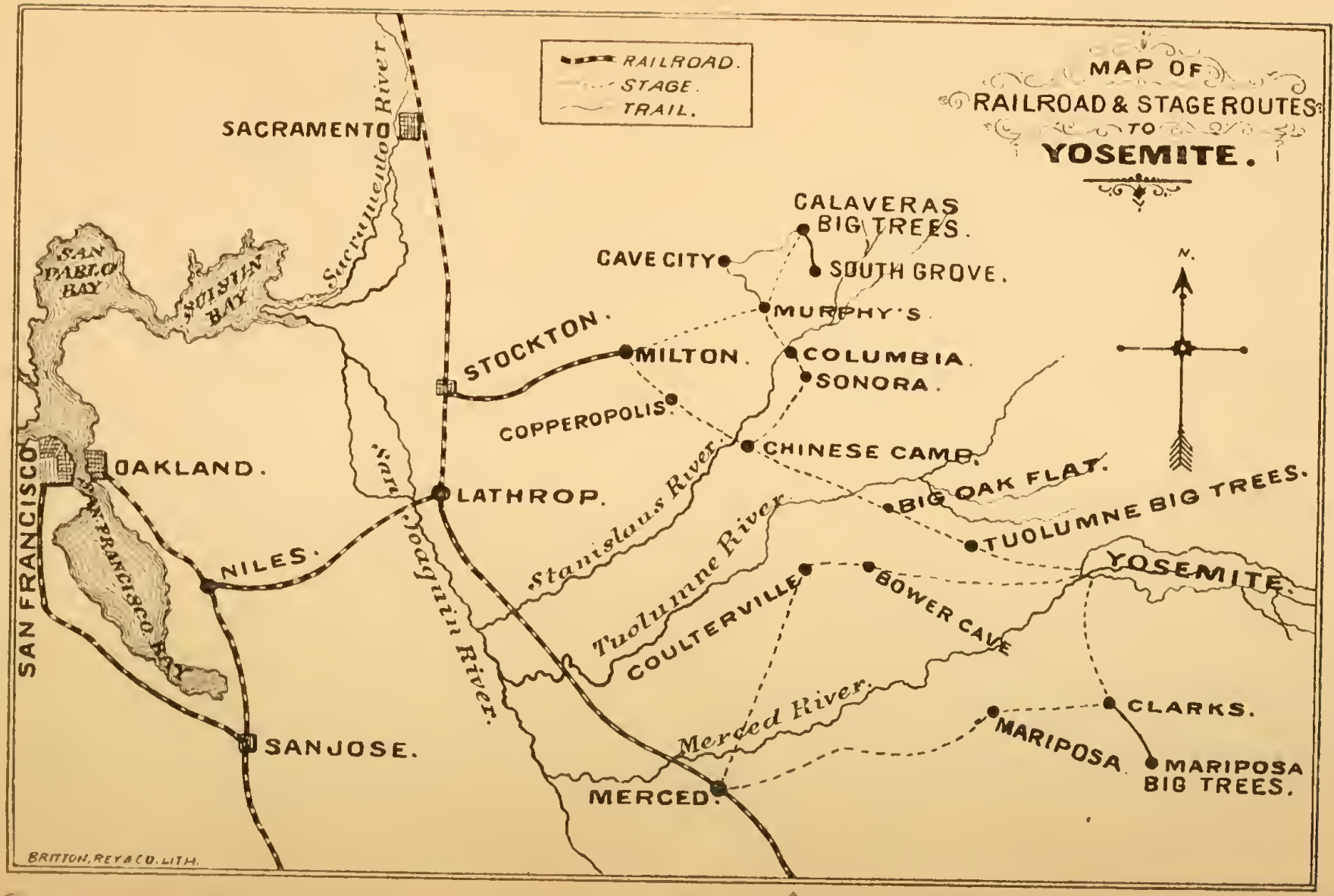
8:15 P. M.; distance, 82 miles. Change cars to the Visalia Division, and arrive at Merced at 10:35 P. M.; distance, 57 miles. Stop over night at Merced. Leave Merced by stage at 6 A. M., and arrive at Dudley's at 5 P. M.; distance, 50 miles. Stop over night at Dudley's. Leave Dudley's at 6 A. M., and arrive in Yosemite Valley at 5 P. M.; distance, 37 miles. Total distance, 226 miles. Actual traveling time, $28\frac{3}{4}$ hours.

Attractions of this Route.—Mining District around Coulterville, Piñon Blanco, Bower Cave, Merced Mammoth Trees, Cañon of the Merced, and a large number of extensive and varied views.

FOURTH ROUTE.

Via Mariposa.—Leave San Francisco at 4 P. M., by Central Pacific Railroad, and arrive at Merced at 10:35 P. M. (railroad ride same as in previous route); distance, 139 miles. Stop over night at Merced. Leave Merced by stage at 6 A. M., and arrive at Clark's at 8 P. M.; distance, 63 miles. Stop over night at Clark's. Leave Clark's at 7 A. M., and arrive in the Yosemite Valley at 12 M.; distance, 25 miles. Total distance, 227 miles. Actual traveling time, $25\frac{3}{4}$ hours.

Attractions of this Route.—Scenery of the Foot-Hills, the Mariposa Mammoth Trees (which are six miles from Clark's, and are reached by horse from that place), the Timber Region of the Sierras, and an abundance of sublime mountain views.


RAILROAD.
STAGE.
TRAIL.
MAP OF
RAILROAD & STAGE ROUTES
TO
YOSEMITE.
N.
SACRAMENTO
Sacramento River
SAN PABLO BAY
SUISUN BAY
CALAVERAS BIG TREES.
CAVE CITY
SOUTH GROVE.
MURPHY'S
STOCKTON.
MILTON.
COLUMBIA.
SONORA.
COPPEROPOLIS.
CHINESE CAMP.
SAN FRANCISCO
OAKLAND.
LATHROP.
San Joaquin River
Stanislaus River
BIG OAK FLAT.
TUOLUMNE BIG TREES.
Tuolumne River
YOSEMITE.
NILES.
SAN FRANCISCO BAY
COULTERVILLE
BOWER CAVE
CLARKS.
Merced River
MARIPOSA
MARIPOSA BIG TREES.
SANJOSE.
MERCED.
BRITTON, REY & CO. LITH.

AUG 6 - 1941